2025 General Plan

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PRESENTED TO

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
ADD	Average Daily Demand
AWWA	American Water Works Association
CIPs	Capital Improvement Plans
DWSRF	Drinking Water State Revolving Fund
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EPA	Environmental Protection Agency
EQ	Equalization
GIS	Geographic Information System
GPM	Gallons per Minute
HVAC	Heating, Ventilation, and Air Conditioning
MCLs	Maximum Contaminant Levels
MCLGs	Maximum Contaminant Level Goals
MDD	Maximum Daily Demand
MG	Million Gallons
MGD	Million Gallons Per Day
NF	Nanofiltration
ng/L	Nanograms per Liter
NSF	National Sanitation Foundation
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PFAS	Per- and Polyfluoroalkyl Substances
PHD	Peak Hour Demand
ppt	Parts per trillion
psi	pounds per square inch
US Census Bureau	United States Census Bureau
WTP	Water Treatment Plant

1.0 INTRODUCTION AND BACKGROUND

The City of the Village of Indian Hill (Village) owns and operates a municipal water treatment and distribution system that supplies water to approximately 15,000 customers within the Village, Camp Dennison, Terrace Park, as well as portions of Madeira, Montgomery, Symmes Township, and Columbia Township. The Indian Hill Water Works (IHWW) raw water supply system consists of nine (9) groundwater wells. The IHWW water treatment plant (WTP) has a firm capacity of 6.0 MGD. Treatment consists of cation exchange softening and chemical addition for disinfection, fluoridation, and corrosion control. The WTP is also equipped with two (2) clearwells for finished water storage, and a high-service pump station. The IHWW distribution system includes two (2) booster pump stations and an elevated tank.

US EPA established National Primary Drinking Water Regulations for six (6) Per- and Polyfluoroalkyl Substances (PFAS) compounds: PFOA, PFOS, PFNA, HFPO-DA, PFHxS, and PFBS. As part of the US EPA's Unregulated Contaminant Monitoring Rule 5 (UCMR5) testing, IHWW has identified three (3) PFAS compounds in the finished water from the WTP. The concentrations found have been consistent with the concentrations found in the raw water supply, thus indicating that these compounds are not being removed by the existing treatment processes. The contamination, which has been caused by others, has required the Village to look into PFAS treatment alternatives or obtain finished water from other sources to eliminate or reduce the PFAS concentration below the EPA Maximum Contaminant Levels (MCLs).

In 2024, the Village conducted a study to evaluate treatment alternatives for removal of PFAS compounds at the WTP. As a part of the study, three (3) treatment technologies were considered: Reverse Osmosis (RO), Anion Exchange (IX) adsorption, and Granular Activated Carbon (GAC) adsorption. The conclusions of the report recommended GAC adsorption as the most effective alternative for PFAS removal at the IHWW system. This report (*PFAS Removal Evaluation at the Indian Hill Water Treatment Plant,* dated January 2024) is included in Appendix A of this report.

1.1 DELINEATION OF THE STUDY AREA

The study area for the Village of Indian Hill encompasses a nearly 20-square-mile region in southwest of Ohio. The Village is located in Hamilton County, Ohio, United States, and is a suburb of the City of Cincinnati. The Village is surrounded by residential areas adjacent with forest cover. The Indian Hill area is a predominantly suburban community characterized by a mix of single-family residential neighborhoods and pockets of open green spaces and natural terrain. Boundary limits of the Village along with the existing water distribution network is shown in Figure 1-1.

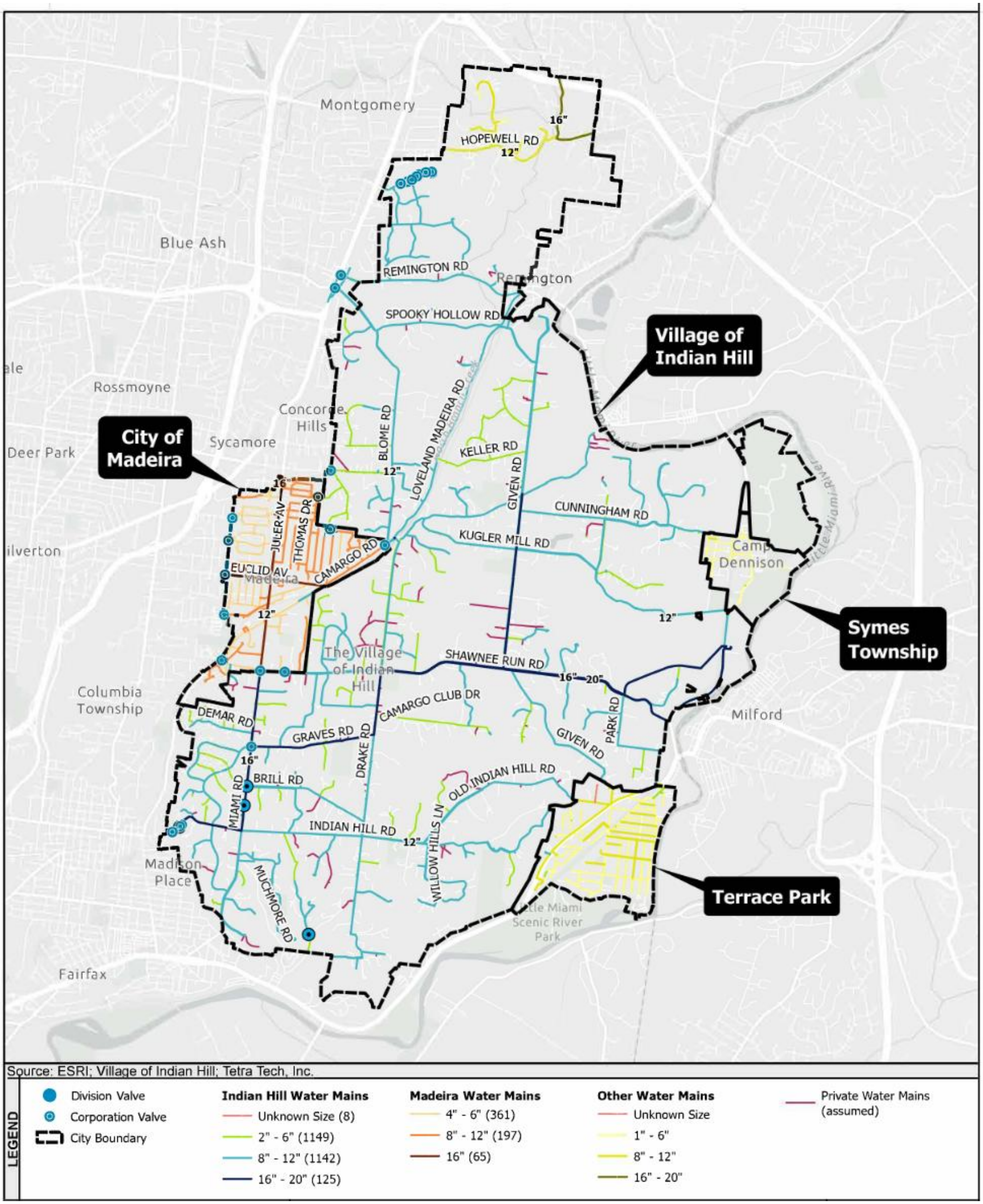

Figure 1-1: Indian Hill Water Distribution System

1.2 LAND USE

The Village is comprised of 100% residential land use, with the exception of schools (public and private), places of worship, a country club, and several non-profit agricultural foundations (Greenacres, Turner Farm, and Peterloon). There is no commercial development or multi-family development. The Village is regulated by a zoning ordinance that divides the area into three (3) main zoning districts: District A, District B, and District C. The utility has zoning districts, 1 Acre, 3 Acre, and 5 Acre, single family residential and agriculture are the permitted uses. The Land Use Plan map (shown in Figure 1-2) is consistent with Village zoning (shown in Figure 1-3).

The Village is not only a rural community, but also a community of single-family residences. The majority of the community is maintained at a density of 0.2 dwelling units per acre (or 5.0 acres per dwelling unit). This planned density is identified as "Rural Estate" on the land use map. The rural estate area runs along the eastern border of the Village and becomes broader as it goes north. Along the northern part of the Village, the rural estate area is uninterrupted from the western to eastern borders of the Village.

In addition, the land use plan shows a moderate area of one (1) dwelling unit per acre density which is limited to the southwest area of the Village where it adjoins the City of Madeira, the City of Cincinnati, Columbia Township, and the Village of Mariemont. This density is identified as "Suburban Estate" on the land use map. Adjoining the suburban estate land area in the southern part of the Village should be an area of 0.3 dwelling units per acre (three acres per dwelling unit). This planned density is identified as "Estate" on the land use map. The plan shows much smaller areas of estate in the more rural northern portion of the Village, again generally surrounding the suburban estate, particularly along Blome and Remington Roads. The suburban estate and estate land areas represent a logical transition in intensity of land use to communities to the west.

1.2.1 Other Land Uses

The only non-residential areas in the village are schools (public and private), municipal buildings, churches, places of worship, and recreational or cultural facilities. As noted in the Chapter 152 of Village Code of Ordinances, the introduction of commercial, office, or industrial uses into the Village would destroy its rural-residential character. The surrounding jurisdictions of Montgomery, Kenwood, Madeira, and Milford provide adequate shopping and other commercial services for the needs of the residents of the Village and of the surrounding area. The remoteness from congested commercial centers is part of the rural living environment of the Village. No commercial uses, except necessary public utility buildings needed to serve the Village residents, should be permitted.

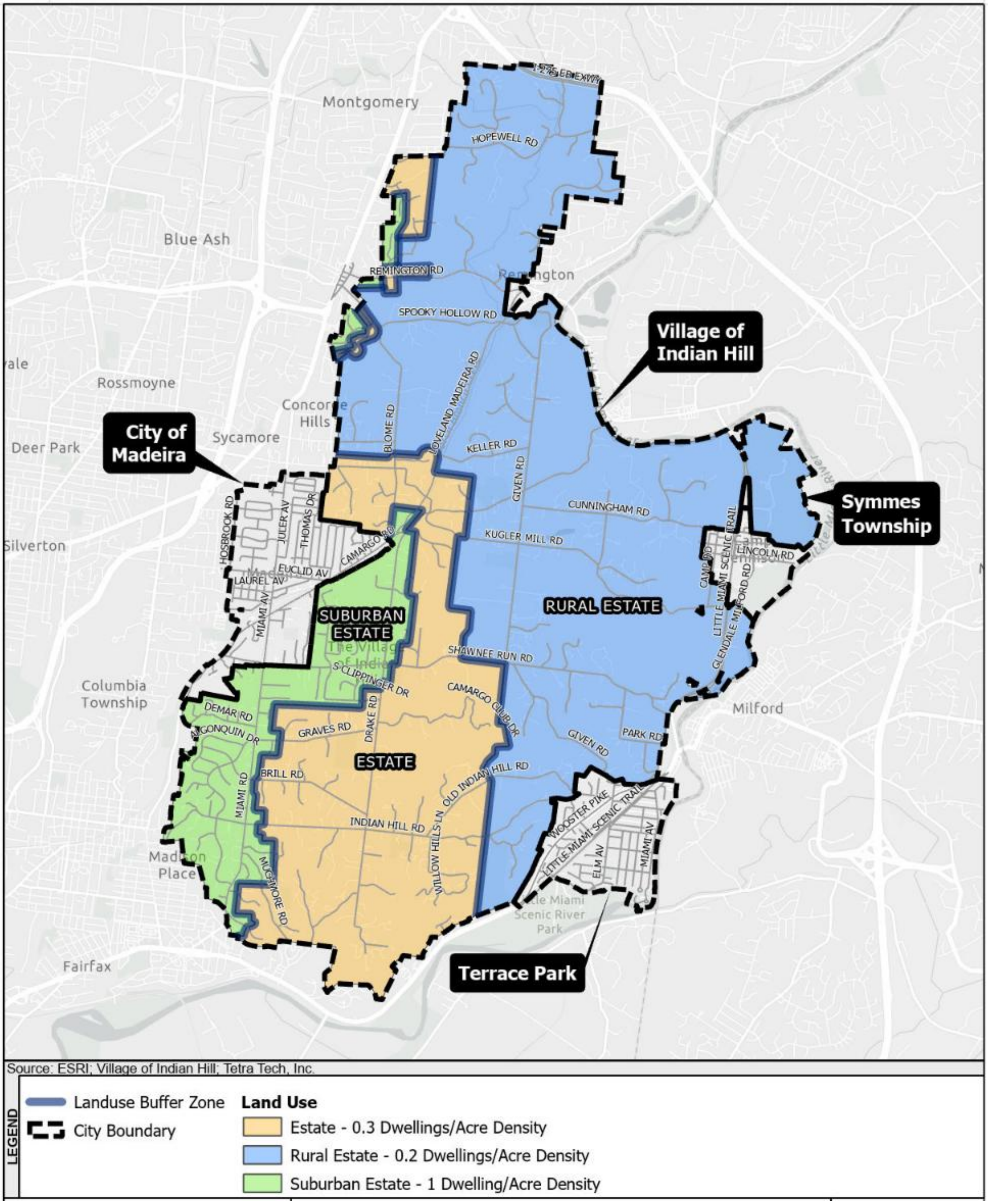

Figure 1-2: Land Use Designations

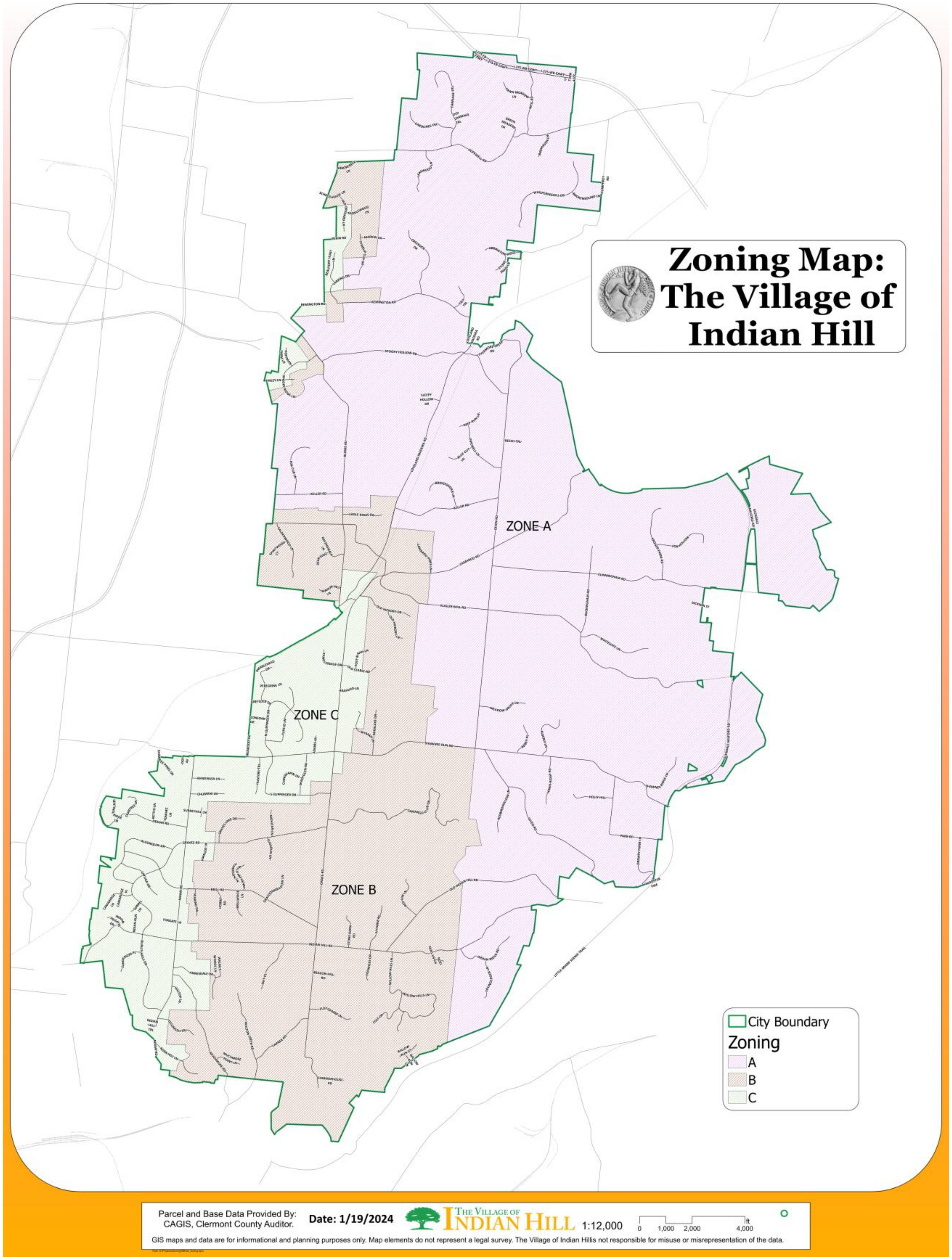

Figure 1-3: Village Zoning Map

1.3 SUMMARY OF APPLICABLE STATE AND FEDERAL REGULATIONS

1.3.1 Ohio Environmental Protection Agency

As of October 2025, there are no primary drinking water standards (MCLs) for PFAS in Ohio. In December 2019, the Ohio Environmental Protection Agency (OEPA) and Ohio Department of Health (ODH) released an action plan to analyze the prevalence of per- and polyfluoroalkyl substances (PFAS) in Ohio's drinking water. Under the plan, Ohio EPA coordinated testing for close to 1,550 community and non-transient non-community public water systems for six (6) PFAS chemicals: PFOA, PFOS, HFPO-DA (GenX), PFBS, PFHxS, and PFNA. Ohio's action plan used the U.S. EPA Health Advisory Levels (HALs) for PFOA and PFOS and established action levels for four (4) additional chemicals in the PFAS family, including GenX, PFBS, PFHxS, and PFNA.

1.3.2 United States Environmental Protection Agency

In April 2024, USEPA finalized a National Primary Drinking Water Regulation (NPDWR) establishing legally enforceable levels (MCLs) for six (6) PFAS in drinking water. PFOA, PFOS, PFHxS, PFNA, and GenX as contaminants with individual MCLs, and PFAS mixtures containing at least two (2) or more of PFHxS, PFNA, GenX, and PFBS using a Hazard Index MCL to account for the combined and co-occurring levels of these PFAS in drinking water. USEPA finalized health-based, non-enforceable Maximum Contaminant Level Goals (MCLGs) for these PFAS. Table 1-1 presents the USEPA MCLs and MCLGs. USEPA's lifetime health advisories identify levels to protect people from adverse health effects from exposure to PFOA, PFOS, GenX chemicals, or PFBS in drinking water. Based on current methods, the 2022 interim health advisory levels for PFOA and PFOS are below the level of both detection and quantitation. This means that PFOA or PFOS can be present in drinking water at levels that exceed health advisories even if testing indicates no level of these chemicals.

Table 1-1: USEPA MCLs and MCLGs

Compound	MCLG (ng/l)	MCL (ng/l)	Health Based Value (ng/l)
Perfluorooctanoic Acid (PFOA)	ND	4.0 ppt	-
Perfluorooctane Sulfonate (PFOS)	ND	4.0 ppt	-
Perfluorononanoic Acid (PFNA)	10	10	
Perfluorohexane Sulfonate (PFHxS)	10	10	
Hexafluoropropylene oxide dimer acid (HFPO-DA, aka GenX)	10	10	
Perfluorobutane Sulfonate (PFBS)	1.0 (unitless) Hazard Index[1]	1.0 (unitless) Hazard Index[1]	2,000
Perfluorohexane Sulfonate (PFHxS)			10
Perfluorononanoic Acid (PFNA)			10
Hexafluoropropylene oxide dimer acid (HFPO-DA, aka GenX)			10

1. The Hazard Index (Equation 1.1) is a tool that USEPA uses to understand health risk from chemical mixtures. The Hazard Index (HI) is made up of a sum of fractions. Each fraction compares the level of each PFAS measured in the water to the highest level determined not to have risk of health effects.

Equation 1: USEPA Hazard Index Equation

$$Hazard\ Index = \frac{PFBS\ ppt}{2{,}000\ ppt} + \frac{PFHxS\ ppt}{10\ ppt} + \frac{PFNA\ ppt}{10\ ppt} + \frac{HFPO{-}DA\ ppt}{10\ ppt}$$

1.3.2.1 IHWW PFAS Sampling

IHWW conducted sampling for PFAS in 2013 and had no detections. At that time, laboratory analysis was only capable of detecting parts per billion (ppb) levels. In 2020, IHWW conducted sampling for the same six (6) PFAS compounds as required by the OEPA. During this testing, PFOS was detected at levels between 12 and 14 parts per trillion (ppt), while the USEPA action level for PFOS at that time was 70 ppt.

The USEPA released the ninth set of data collected under the fifth Unregulated Contaminant Monitoring Rule (UCMR 5) for the 30 chemical contaminants (29 per- and polyfluoroalkyl substances [PFAS] and lithium). The Safe Drinking Water Act (SDWA) requires that once every five (5) years the EPA issue a list of unregulated contaminants to be monitored by public water systems (PWSs).Recent UCMR5 sampling results (2023) for the IHWW PWS identified three (3) PFAS compounds (PFOS, PFBS and PFPeA) present in the finished water, two (2) of which (PFOS and PFBS) are included in the US EPA MCL's.

The PFAS concentrations identified in the UCMR5 data are shown in the Table 1-2 below. In addition to the results provided below, PFPeA was also detected in the Village's finished water at a concentration of 3.1 ppt.

Table 1-2: 2023 UCMR5 Testing Results

Compound	EPA MCL (ng/l)	Health Based Value (ng/l)	Results of UCMR5 Testing[1](ng/l)
Perfluorooctanoic Acid (PFOA)	4.0 ppt	-	ND
Perfluorooctane Sulfonate (PFOS)	4.0 ppt	-	12.4, 10.9
Perfluorononanoic Acid (PFNA)	1.0 (unitless) Hazard Index	10	ND
Perfluorohexane Sulfonate (PFHxS)		10	ND
Perfluorobutane Sulfonate (PFBS)		2,000	4, 3.6
Hexafluoropropylene oxide dimer acid (HFPO-DA - GenX Chemicals)		10	ND

1. 2023 UCMR5 Testing Results (https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule#5)

As part of a rapid small scale column test (RSSCT) evaluation (Appendix D), a raw water sample was collected at the water treatment plant on June 11, 2025. The raw water was analyzed for PFAS compounds using EPA Method 537.1. PFOS was the only compound detected above the method detection limit. The 12 samples had an average concentration of 5.22 ppt and a maximum of 6.0 ppt for PFOS, exceeding the EPA MCL of 4.0 ppt.

1.3.2.2 PFAS Removal Technology Evaluation

In January 2024, the Village performed a study to evaluate PFAS removal options at the IHWW WTP (see Appendix A). Three (3) treatment technologies were considered: RO, IX adsorption, and GAC adsorption. Using RO was determined to be the least suitable for the Village's water system as this process would require a bypass stream to maintain stable water quality in the finished water. This bypass stream would need to be treated with another PFAS removal technology to meet the proposed PFAS regulations in the combined finished water. Furthermore, an RO system would create a concentrated waste stream containing PFAS, TDS, and other components present in the Village's raw water system. There is not a local sanitary sewer system to discharge any waste stream and discharge to Little Miami River is not preferred. Thus, RO was not recommended for the Village's water system. Adsorption with IX or GAC media would both be effective in PFAS removal at the Village's WTP with limited disruption to the existing treatment process. Both adsorption systems would cause additional headloss on the water system. This would be addressed with the addition of booster pumping with a firm capacity of 6.0 MGD to match the firm treatment capacity of the PFAS Removal Facility and WTP.

Use of GAC media provides some additional benefits as compared to IX media, including: (1) generally more effective at treating long-chain PFAS which is present in the water supply, (2) more effective at adsorbing other contaminants that may occur in the raw water supply, and (3) ability to convert GAC contactor vessels to IX media. The report also noted that the media costs of GAC are lower and have been historically more stable than those of IX. Thus, due to the recurring costs of replacing the adsorption media, GAC adsorption was recommended for PFAS removal at the Village's water system.

1.4 POPULATION PROJECTIONS

Historical population data from the US Census Bureau indicate that the Village's population has remained stable or declined slightly over the past three (3) years. Whereas from 2010 to 2020, an approximate 1% annual increase in population was observed. For projection purposes, the population was assumed to slightly increase by 1% over the next 20 years based on 2010 to 2020 population trend.

Table 1-3 indicates the historical and projected population within the Village through 2045. The historical data shows a mixed trend of population increase and decline in the Village's population from 2000 to 2020. The census data show that the population decreased by 0.41% from 2000 to 2010 and increased by 1.04% from 2010 to 2020. The study used a conservative approach, in relation to past population trends observed from 2010 to 2020, of about 1% annual change in population to project the future population for the Village. However, given the uncertainties and variability in population patterns, this study does not rely on population projections to estimate future water flow demand. Instead, long-term historical water production data has been used as the primary basis for projecting future water demands, providing a more direct and reliable indicator for the future water demand trend. These future water demand projects assume that Madeira will be switching to GCWW for water supply (according to City of Madeira Ordinance 25-02) and thus, flow demands from Madeira were excluded.

Table 1-3: Village of Indian Hill Population

Year	Population	Annualized Change
2000*	5,907	-
2010*	5,785	-0.41%
2020*	6,087	1.04%
2023**	6,048	-0.64%
2025 Projection***	6,108	1%
2030 Projection***	6,170	1%
2035 Projection***	6,231	1%
2040 Projection***	6,294	1%
2045 Projection***	6,357	1%

*US Census Bureau
** U.S. Census Bureau's American Community Survey (ACS) 5-Year Estimates
***Growth rate of 1% annual assumed based on 2010 to 2020 growth.

The Village's water system also supplies finished water in the neighboring areas Camp Dennison, Terrace Park and portions of Madeira, Montgomery, Symmes Township, and Columbia Township. As noted in the 2025 Village Council meetings, IHWW is anticipated to lose about 40% of its current customer base from Madeira (see City of Madeira Ordinance 25-02 Updates in Appendix F), following the Madeira Council's decision to switch their water supply to Greater Cincinnati Water Works (GCWW). These customers currently account for approximately 20% of IHWW's total water consumption. A detailed discussion and presentation from the Townhall meeting can be found on the Village of Indian Hill website (https://indianhill.gov/town-hall-summary/) Potential impacts on current and future water demands is presented in Section 1.5.

1.5 WATER DEMANDS

The Village's historical water demands from 2013 through 2022 were reviewed to determine current and future water treatment needs. The Village's average-day demand (ADD) and maximum-day demand (MDD) were used to calculate a yearly peaking factor (PF, MDD:ADD). This data is summarized in Table 1-4. A PF of 2.21 was calculated based on the 95th percentile of observed WTP production data from 2013 to 2024.

Table 1-4: Historical Water Demands

Year	ADD (MGD)	MDD (MGD)	MDD:ADD Peaking Factor
2013	1.68	3.59	2.14
2014	1.85	3.5	1.89
2015	2.02	3.55	1.76
2016	2.08	4	1.92
2017	2.15	4.27	1.99
2018	2.1	4.64	2.21
2019	2.26	4.99	2.21
2020	2.21	4.46	2.02
2021	2.21	4.54	2.05
2022	2.26	4.29	1.90
2023	2.307	4.676	2.03
2024	2.35	4.687	1.99
Average			2.01
Standard Deviation			0.128
95th Percentile			2.21

Historical billing data (2019-2024) for meters in the City of Madeira were evaluated to determine the impact of those accounts leaving the IHWW system. Table 1-5 and Figure 1-4 show the historical ADDs and MDDs, both with and without Madeira's water use. With and without water demands from Madeira, the 2024 ADD is 2.35 MGD and 1.9 MGD, respectively.

Table 1-5: Average and Max Day Demands, 2019-2024

Year	ADD (MGD)	MDD (MGD)	ADD (MGD)	ADD (MGD)	MDD (MGD)
	With Madeira		Madeira	Without Madeira	
2019	2.26	4.99	0.426	1.83	4.05
2020	2.21	4.46	0.472	1.74	3.84
2021	2.21	4.54	0.451	1.76	3.89
2022	2.26	4.29	0.462	1.79	3.97
2023	2.30	4.67	0.465	1.84	4.07
2024	2.35	4.69	0.432	1.92	4.24

Historical demand data for the entire system (including Madeira) were analyzed for the years 2015 through 2024. This data was used to determine the average annual growth rate to project future demands. The trendline of the historical demand data shows the average annual flow demand increased at a rate of 0.0327 MGD per year (see Figure 1-5). An analysis of the Madeira billing data (2019-2024) showed an annual water demand increase of 0.0006 MGD/year. For this analysis, the annual water demand increase (0.0321 MGD/year) was applied after adjusting for the loss of Madeira.

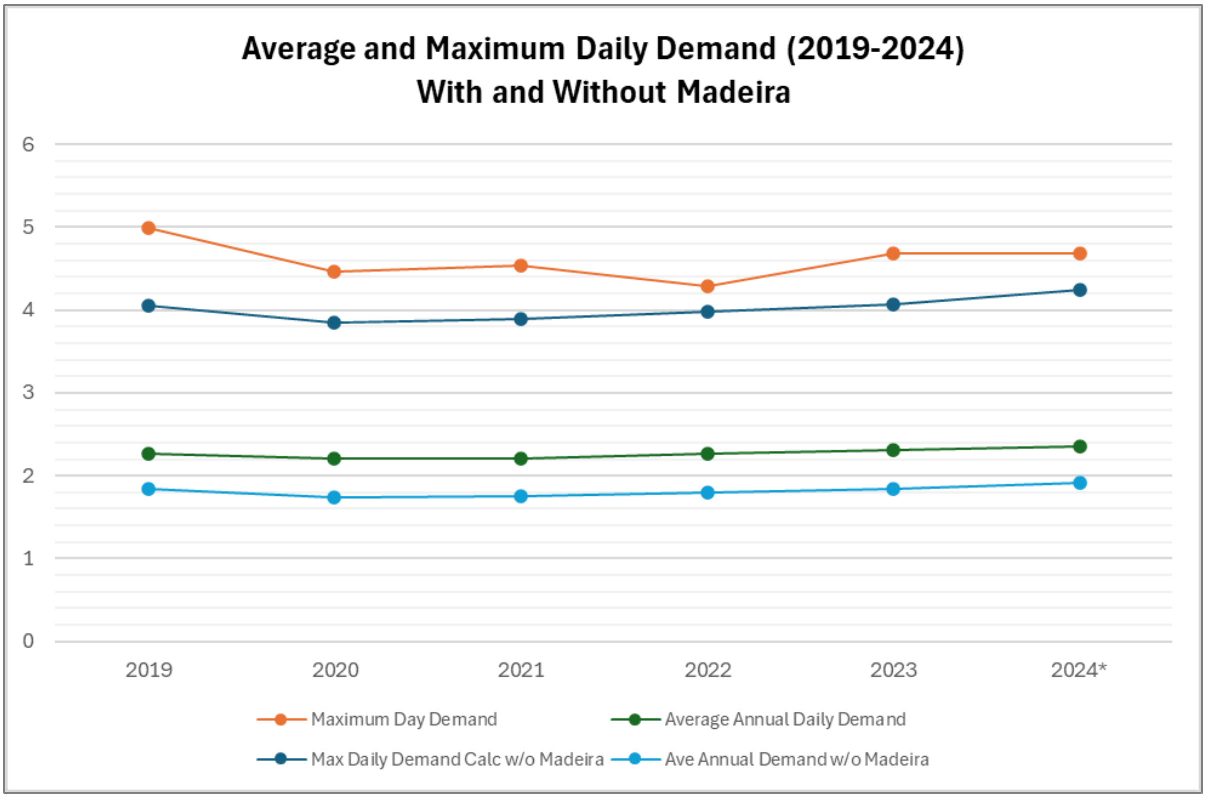

Figure 1-4: Average and Max Day Demands, 2019-2024

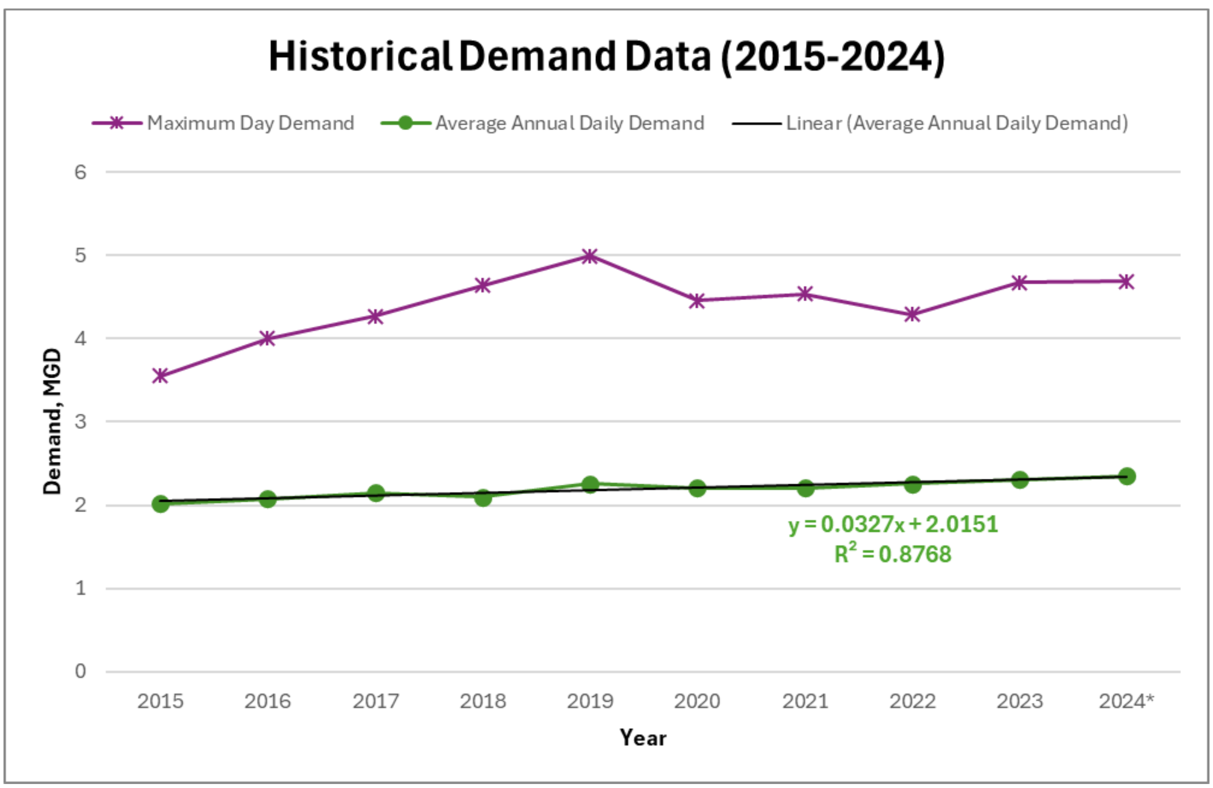

Figure 1-5: Historical Demand (with Madeira), 2015-2024

The 2025 ADD was projected to Year 2045 assuming an annual increase of 0.0321 MGD. A 2.21 peaking factor was applied to the 2045 ADD (2.52 MGD) to determine the 2045 MDD (5.58 MGD). The projected 2025 and 2045 ADDs and MDDs are presented in Table 1-6. The IHWW water supply wells have a firm capacity of 7.5 MGD and the WTP has a firm capacity of 6.0 MGD. The 2045 projections indicate the existing WTP has sufficient capacity for projected demands.

Table 1-6: Current (2025) and Future (2045) Demands

Description	2025 (Current)	2030 (Projected)	2035 (Projected)	2040 (Projected)	2045 (Projected)
Average-Daily Demand (ADD)[1]	1.92 MGD	2.05 MGD	2. 21 MGD	2.37 MGD	2.52 MGD
Peaking Factor	2.21				
Max-Day Demand (MDD)[1]	4.24 MGD	4.52 MGD	4.88 MGD	5.23 MGD	5.59 MGD

1 – Demand projections assume the City of Madeira is leaving the IHWW system.

1.6 EXISTING FACILITIES

IHWW currently serves more than 15,000 residents in the Village and neighboring cities and townships. Based on the 2024 water billing data, approximately 54% of the water usage is by the Village of Indian Hill, 23% by City of Madeira, 20% by Village of Terrace Park, 3% by portions of Camp Dennison, Columbia Township, City of Montgomery and Symmes Township, and 0.2% by City of Milford. Figure 1-6 presents IHWW WTP service area, including the existing distribution system with topographic imagery. The IHWW WTP is located at 7100 Glendale Milford Road.

The IHWW WTP is supplied by nine (9) groundwater supply wells located immediately east of the plant near the Little Miami River. The IHWW well system has a firm capacity (with the largest capacity well out of service) of 7.5 MGD. The treatment process consists of cation exchange softening, high service pumping, storage, and distribution.

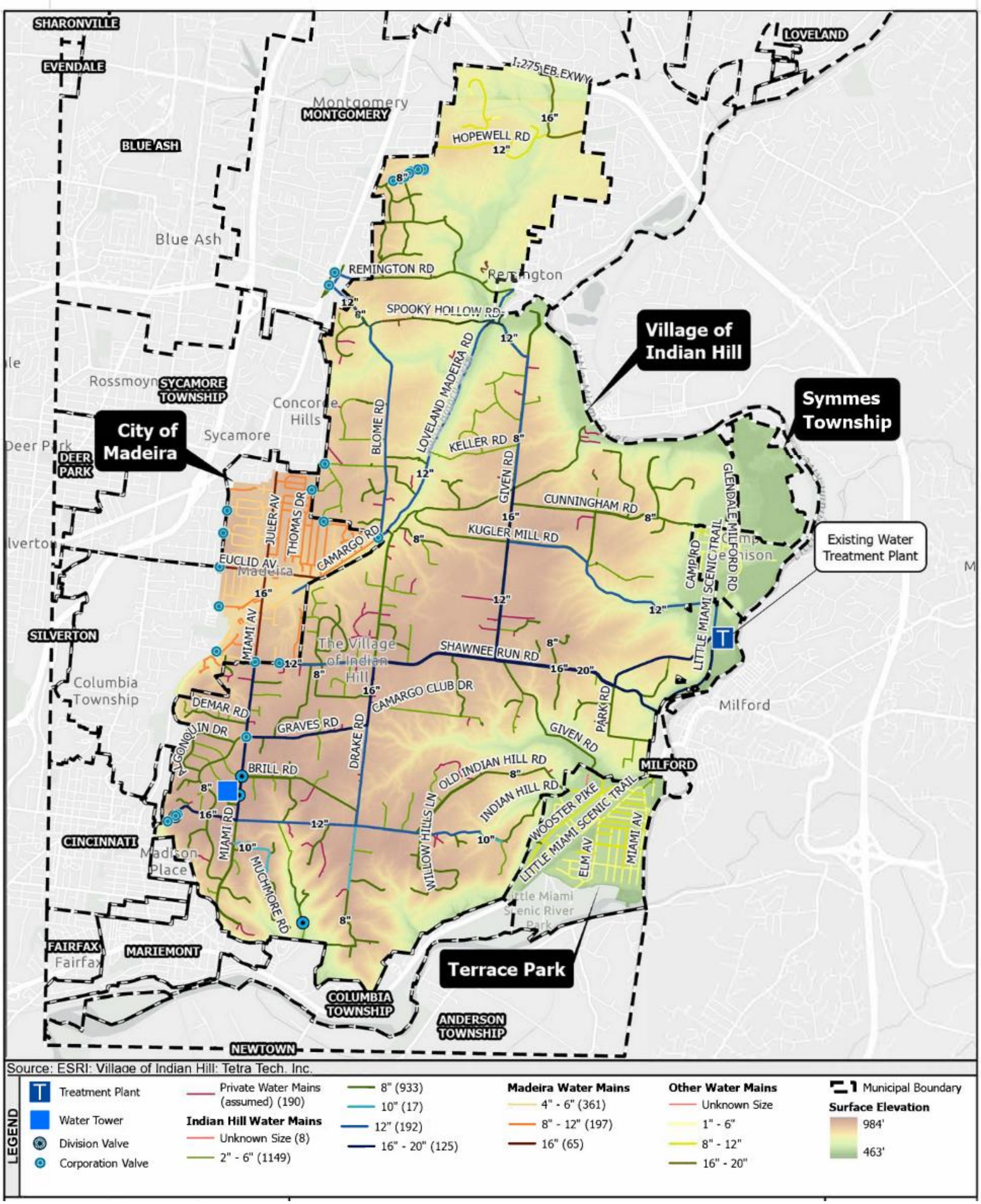

Figure 1-6: Village of Indian Hill and Other Regional Areas

1.6.1 Water Supply Wells

IHWW owns and operates nine (9) wells for the groundwater supply. The wellfield is located on the eastern boundary of the Village of Indian Hill, along the Little Miami River. The Little Miami aquifer is the source of IHWW's raw water. The existing well pumps have capacities ranging from 350 GPM to 880 GPM per well. Table 1-7 outlines the capacities of the existing supply wells. Wells #3 through #8 are located on and near the WTP site, west of the Little Miami River. Wells #9 through #11 are located on the east side of Little Miami River. The Village typically operates one (1) to three (3) wells during low demands, and six (6) to seven (7) wells during peak demand conditions. The capacity of the Village's raw water pumping system is summarized below in Table 1-7.

Table 1-7: Current Supply Well Pumping Capacity

Well Number	Current Capacity (GPM)	Current Capacity (MGD)
Well No. 3	350	0.50
Well No. 4	500	0.72
Well No. 5	450	0.65
Well No. 6	650	0.94
Well No. 7	800	1.15
Well No. 8	880	1.27
Well No. 9	875	1.26
Well No. 10	800	1.15
Well No. 11	750	1.08
Total Capacity	8.7	8.72
Firm Capacity	7.5	7.5

The Village's firm raw water capacity, or capacity with the largest well out of service, is 7.5 MGD. Ten States Standards (Recommended Standards for Water Works, Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers) recommends a water system's firm raw water capacity exceed the system's MDD. Compared to the current MDD (4.24 MGD) and 2045 projected MDD (5.58 MGD), there is sufficient raw water pumping capacity to meet projected demands.

In September 2024, during extreme drought conditions, the Village was unable to pull more than approximately 3.5 MGD from the local aquifer. The pumps were "pulling air", indicating the aquifer level was below the pump intakes. For approximately four (4) to five (5) weeks, the Village had to utilize the emergency connections with GCWW to supply water to the Village. While the well pumping capacity exceeds the WTP treatment capacity, the aquifer capacity appears to limit the available supply during drought conditions.

1.6.2 Water Treatment Plant

The water treatment plant is located on 7100 Glendale Milford Road Raw water is pumped into the treatment plant, which consists of original WTP (Plant No. 1) constructed in 1949 and an expansion (Plant 2) from 1991. Both these plants have six (6) cation exchange softening vessels. The Plant 1 vessels have a flow through capacity of 230 and 250 GPM and Plant 2 vessels have a capacities of 230 GPM.

Table 1-8: Existing Softening System Capacity

Description	Capacity per IX Vessel (GPM)	No. of Vessels	Total Capacity (MGD)[1]
Plant No. 1	250	3	1.07
Plant No. 1	230	3	0.99
Plant No. 2	230	6	1.98
Total Treatment Capacity (MGD)			4.04
Firm Capacity assuming 11 vessels operating and one (1) vessel undergoing backwash/regeneration)			3.68

1 - Assuming no blending of raw water around the softening process.

The Village's water system has a firm softening capacity (with one vessel out of service for backwash) of 3.77 MGD. At each plant, however, a portion of the raw water feed bypasses treatment and blends with the softened water to achieve a finished water hardness of 150 to 170 mg/L as $CaCO_3$. Approximately 40% of the Village's finished water bypasses the Ion Exchange (IX) softeners. Therefore, the IHWW WTP has capacity to produce 6.0 MGD of finished water. Ten States Standards recommend that the firm treatment capacity should exceed the system's MDD. Compared to the current MDD (4.24 MGD) and 2045 projected MDD (5.58 MGD), there is sufficient WTP capacity to supply the projected demands.

Softened water from Plant No. 1 and Plant No. 2 combine at Clearwell 1, located inside Plant No. 1. Finished water then flows by gravity from Clearwell 1 to the High Service Pump (HSP) Clearwell located east of the WTP. Fluoride, zinc orthophosphate, and chlorine for fluoridation, corrosion control, and disinfection, respectively, are also fed into the 36-inch gravity line between the clearwells. A general arrangement of the existing WTP components onsite is shown in Figure 1-7.

1.6.2.1 Chemical Systems

The WTP uses cation exchange for the water softening process. This treatment system is critical to reduce water hardness. Two (2) salt storage tanks are located at the WTP site to store sodium chloride for media regeneration.

The WTP feeds sodium hypochlorite (NaOCl) to dose chlorine for disinfection with the associated equipment located in the Chemical Feed Building. A bulk tank, day tank, transfer pump and feed pump are used to store and feed sodium hypochlorite solution to chlorinate the softened water.

Other chemicals applied at the WTP include zinc orthophosphate for corrosion control, and fluoride for prevention of dental caries. Each of these systems include bulk storage tanks, day tanks, and chemical feed pumps. The systems are adequately sized given the current system demands and typical chemical dosage.

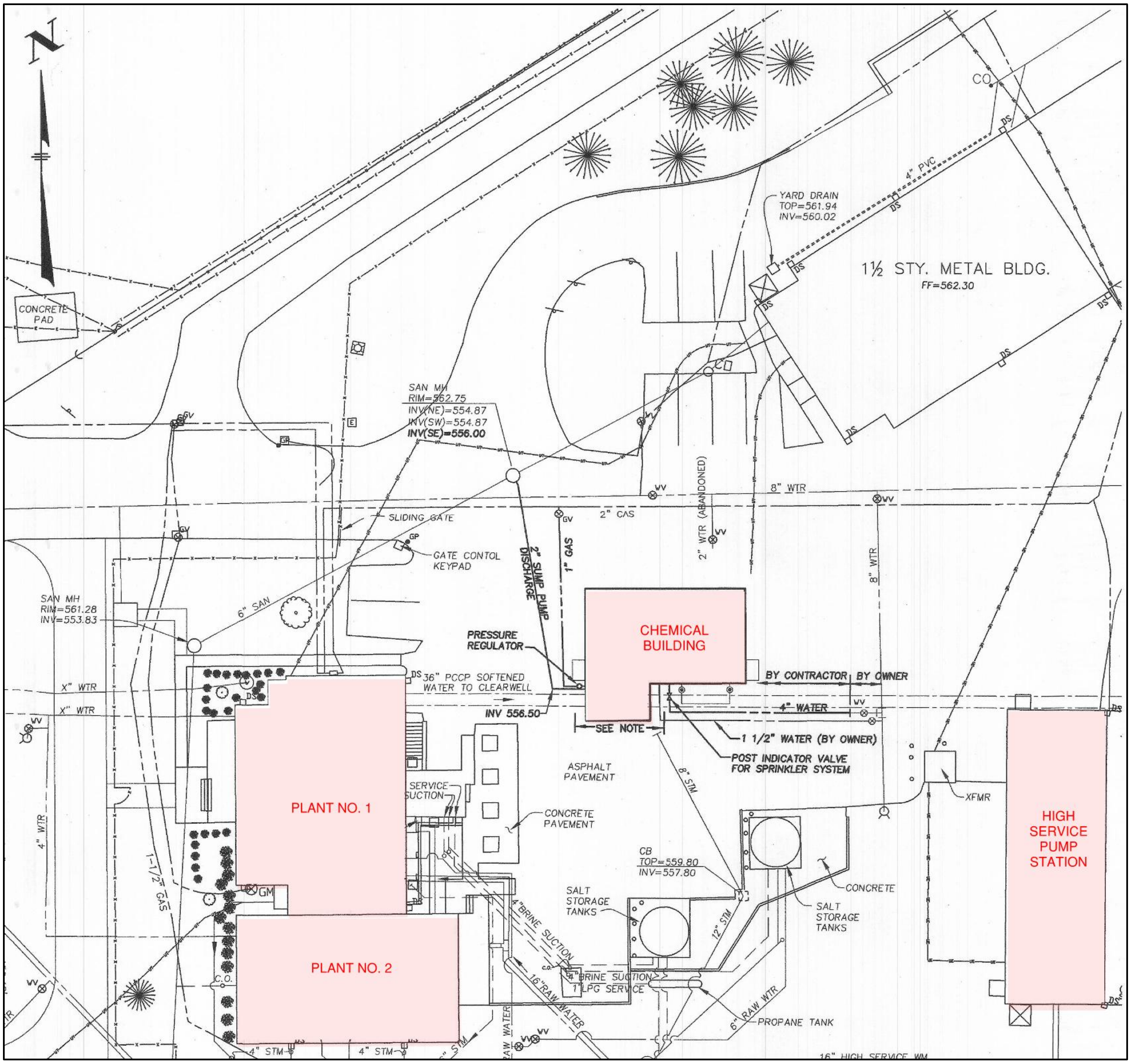

Figure 1-7: Existing Water Treatment Plant

1.6.3 Water Distribution System

The IHWW water distribution system serves the Village of Indian Hill south of Hopewell Road, part of the City of Madeira, and all of Terrace Park and Camp Dennison, part of Montgomery, Symmes Township, and Columbia Township. Distribution lines in the system were constructed as far back as 1922. IHWW includes one (1) water tower, constructed in 1949, located just west of Miami Avenue and north of Indian Hill Road. The IHWW distribution system includes more than 100 miles of water main in the Village and approximately 50 miles of water main in the townships/municipalities served. The water mains range in size from 4-inch to 20-inch diameter. Cast iron is the most common material present in the system, followed by Ductile Iron, Asbestos Cement, and a minor amount of plastic pipes. Most of the pipes in the system were installed before 2001, according to the Village's Geographic Information System (GIS) database.

The Village's water distribution system includes 3.7 MG of storage and additional booster pumping. Storage includes one (1) elevated storage tank and three (3) underground storage reservoirs. The three (3) Miami Road underground reservoirs have a storage capacity of 3.2 MG (1.2 million gallons and two (2) 1.0 million gallons each), and the Miami Road elevated tank has a storage capacity of 0.5 MG. The water tower has an effective operating range of approximately 3.5 feet.

The distribution system includes two (2) booster pump stations (BPS). BPS No. 1 has two (2) 50 HP pumps each with a capacity of 1,500 GPM which pump water from the underground reservoirs to the elevated tank. BPS No. 1 has a total capacity of 4.32 MGD and a firm capacity of 2.16 MGD. BPS No. 2 provides water to the high-pressure district via four (4) 5.0 HP pumps, each with a capacity of 233 GPM. BPS No. 2 has a total capacity of 1.34 MGD and a firm capacity of 1.0 MGD.

According to the 2008 Master Plan Report, the IHWW water system has four (4) pressure zones. There is the main zone serving most customers. This zone floats off of the elevated tank elevation at 960. Camp Dennison is a low-pressure zone created by a pressure-reducing valve (PRV) on Cunningham Road. Terrace Park and adjacent areas of the Village comprise a second low pressure zone created by three (3) PRVs located on Park Avenue, Given Road, and Indian Hill Road. The fourth pressure zone was originally created to address an area of high ground (and, therefore, low pressure) in the general area of Indian Hill Road and Miami Avenue. Several years ago, this area was extended east to Drake Road and Indian Hill Road and then further east on Indian Hill Road to its terminus (the PRV feeding Terrace Park). Usually, a high-pressure zone is created by building a second tank at a higher elevation and pumping from the main pressure zone to that tank. Indian Hill's high-pressure zone uses the less common method of having a set of pumps that run continually to maintain pressure in the zone. The pump speeds are adjusted to exactly match system demand.

1.6.4 WTP Pumping

The high-service pump station is located approximately 150 feet east of the WTP, and it pumps water from the High Service Pump (HSP) Clearwell to the distribution system and storage tanks located near the water tower. The HSP Station is equipped with six (6) 200-HP pumps that draw from the HSP Clearwell. The capacity of the HSP Station is summarized in Table 1-9.

Table 1-9: High Service Pump Summary

Pump	Capacity (GPM)
Pump No. 1	1,400
Pump No. 2	1,400
Pump No. 3	1,400
Pump No. 4	1,400
Pump No. 5	1,400
Pump No. 6	1,400
Total Capacity (MGD)	12
Firm Capacity (MGD)	10

The high-service firm pumping capacity (one pump out of service) is 10.0 MGD. Ten States Standards recommend that the water system firm pumping capacity exceed the water system's peak hour demands. The firm capacity of the pump station is greater than the current MDD (4.24 MGD) as well as 2045 MDD (5.59 MGD) and equal to 1.5 times the plant design treatment capacity of 6.0 MGD.

1.7 PLANNED CAPITAL IMPROVEMENT PROJECTS

The IHWW Capital Improvements Program includes the following projects that are scheduled for implementation over the next several years. A detailed cost summary of the CIP projects is included in Appendix C of this document.

- Overflow Pipe Modification at Existing Water Tower - The project includes rerouting the existing overflow pipe at the water tower to improve drainage and prevent overflow issues. Design and construction planned for 2025. (Design and Construction Cost $115,000).
- Burley Hills Water Main Replacement - Water main upgrades include replacement of approximately 3,800 linear feet of 6-inch waterline with new 8-inch pipe and two (2) culvert pipes to improve fire flow capacity and address deteriorated infrastructure. Design and construction scheduled for 2026. (Design and Construction Cost $1.57M).
- Mohican Drive Water Main Replacement - Replacement of 1,050 linear feet of existing 6-inch water main with 8-inch pipe is recommended to improve fire flow capacity and replace aging pipes. Design and construction scheduled for 2026. (Design and Construction Cost $0.43M).
- Camargo Road Water Line Replacement - Water main replacement and upsizing of approximately 1,225 linear feet of water main to 8 inches is needed to improve fire flow and replace aged infrastructure. Design in 2026 and construction planned for 2027. (Design and Construction Cost $0.51M).
- Spooky Ridge, Hoffman Farm, & Finley Lane Water Main Replacement - Replacement of approximately 5,200 linear feet of 8-inch water main is recommended due to pipe age and condition, maintaining adequate fire flow and system integrity. Design in 2026 and construction in 2027. (Design and Construction Cost $2.15M).
- Water Softener Valve Replacement - Replacement of water softening valve trees at the water treatment plant is necessary due to age-related efficiency decline, improving treatment reliability and reducing maintenance. Design in 2026 and construction over 2027-2029. (Design and Construction Cost $0.50M).
- Camaridge Place Water Main Replacement - Replacement and upsizing of approximately 245 linear feet of water main to 8 inches is recommended to improve fire flow and replace aging pipe segments. Design in 2027 and construction in 2028. (Design and Construction Cost $0.10M).
- Beech Trail Water Main Replacement - Replacement and upsizing of approximately 710 linear feet of water main to 8 inches is needed to address pipe age and condition, ensuring improved fire flow and system reliability. Design in 2027 and construction in 2028. (Design and Construction Cost $0.29M).
- Buckingham Place (Dead End Section) Water Main Replacement - Replacement and upsizing of approximately 1,100 linear feet of 8-inch water main is recommended to improve fire flow and replace deteriorated pipe sections. Design in 2027 and construction in 2028. (Design and Construction Cost $0.46M).
- Shawnee Run (Clippinger to Drake Rd) & Adams Road Improvements - Watermain upgrades recommended include installation of a new 20-inch main along Shawnee Run Road and replacement of the Adams Road waterline with an 8-inch main. The project also includes replacement and expansion of the storm sewer system, construction of detention facilities, curb replacements, and full roadway reconstruction and repaving to improve fire flows, mitigate flooding, and restore deteriorated road infrastructure. Design in 2027 and construction in 2028. (Design and Construction Cost $4.18M).
- South Given Road (Redbird Hollow Ln to Trail Head) & Redbird Hollow Ln - Replacement of water mains on both Redbird Hollow Lane and South Given Road is recommended, along with replacement and

rerouting of the storm sewer system to reduce hillside erosion. The project includes replacement of curb on one side of the road and addition of gutters to improve drainage. Design in 2028 and construction in 2029. (Design and Construction Cost $2.76M).

- Plant #2 Motor Control Center Replacement - Replacement of the motor control center at Plant #2 is necessary due to age-related reliability concerns. Design and construction planned for 2029. (Design and Construction Cost $0.1M).
- Miami Road Water Line Replacement (South of Indian Hill Road to Rock Hill) - Replacement of approximately 4,000 linear feet of water main along Miami Road is recommended to maintain reliable water service, improve fire flow capacity, and replace aged infrastructure. Design completed in 2024 and construction planned for 2030. (Construction Cost $1.48M).
- Park Road & Hollyhill Water Line Replacement - Replacement of approximately 5,700 linear feet of water main on Park Road and 1,600 linear feet on Hollyhill is recommended due to age and poor condition to maintain reliable service and improve fire flow. Design in 2029 and construction in 2030. (Design and Construction Cost $3.13M).

1.7.1 2025 Master Plan

The Village's 2025 Master Plan Report identified the following improvements to meet fire flow requirements and peak-hour demands.

- Watermain upgrades recommended in the report include installation of an 8-inch main between the south end of Calderwood Lane and the west end of Manor Hill Lane. The other water main recommended was replacement of existing waterlines with new 16-inch water mains along Shawnee Run Road (between Miami Road and Drake Road) and 16-inch along Drake Road (from Shawnee Run Road to Loveland Madeira Road). The opinion of probable construction cost for these water main upgrades is approximately $9.4M (2025 Dollars).

A new elevated water tower was recommended to meet peak-hour demands and address the existing tanks age, height, and inadequate hydraulics. The report concluded the new tower should have a minimum volume of 1.0 MG to an upper limit of 1.5 MG. The IHWW CIP includes a 1.0 MG tank. The 2025 Master Plan Report also notes that previous analyses recommended similar tank sizes in both 2008 and 2011. The Village received an opinion of probable construction cost of $7.0M to construct a new 1.0 MG water tower.

2.0 ALTERNATIVES EVALUATION

An Alternatives Evaluation was performed to evaluate options for providing a centralized PFAS treatment facility and options that avoid providing PFAS treatment at the IHWW WTP. This evaluation is meant to meet the requirements of the OEPA General Plan to evaluate feasible alternatives including a “Regionalization” alternative, which would avoid the need for providing PFAS treatment. The following alternatives were evaluated:

- **Alternative 1 - Maintain IHWW Operations and Add a New PFAS Treatment Facility**

  In this approach, the primary focus is on upgrading the WTP while retaining its current softening treatment methods. This alternative involves adding new GAC vessels and associated equipment, infrastructure, and systems to the WTP to achieve compliance with PFAS regulatory standards, all while maintaining the current IHWW water supply from existing wells and distribution through the existing distribution system. Additional water supply wells are required to maintain 6.0 MGD supply capacity during drought conditions.

- **Alternative 2 – GCWW Supply & IHWW Distribution**

  Alternative 2 includes becoming a wholesale customer to Greater Cincinnati Water Works (GCWW). GCWW would supply treated surface water (from the Ohio River), the existing IHWW WTP and associated wells will no longer be required and would need to be abandoned. Although, treated water from the GCWW treatment system will be delivered to the IHWW distribution system, the Village will continue to be responsible for the operation and maintenance of the distribution system, meter reading, and customer billing.

- **Alternative 3 - GCWW Supply & Distribution**

  For Alternative 3, the Village would abandon/demolish its existing water supply and treatment facilities and operation and maintenance (O&M) of the distribution system will be transferred over to Greater Cincinnati Water Works (GCWW). Treated water will be supplied from GCWW. The Village’s existing water facilities would be decommissioned, and necessary upgrades would be made to the distribution system to support the transition and ensure sufficient transmission capacity.

Sections 2.1 through 2.3 present the details for each alternative evaluated. Section 2.4 presents the life-cycle costs for each alternative. Section 2.5.4 summarizes present worth of each alternative and section 3.0 identifies the Selected Alternative.

2.1 ALTERNATIVE 1 – MAINTAIN IHWW OPERATIONS AND ADD A NEW PFAS TREATMENT FACILITY

2.1.1 Water Treatment Plant Upgrades

This alternative involves the construction of a new PFAS treatment facility near the existing WTP. As stated in Section 1.3.2.2, three (3) treatment alternatives were evaluated and (RO, IX, and GAC) and a GAC adsorption approach was recommended.

A new building would be constructed adjacent to the existing WTP to house GAC contactor vessels and a new booster pump station. The proposed booster pumps would be installed on the diverted raw water flow from the wells and upstream of the GAC Contactors. The booster pumps would maintain water pressure and flow through the system, ensuring operational reliability. The booster pumps would have a total capacity of 4,000 gallons per minute with the capacity to serve up to the 6.0 MGD (4,167 GPM) maximum treatment capacity and the associated head losses that occur at higher flow rates. Pressurized discharge from the booster pumps will go through the GAC filters and ion exchange system.

The GAC adsorption aims to reduce PFAS levels to below the established USEPA PFAS MCLs. Multiple configurations were considered, use of 12-foot diameter vessels arranged as four (4) sets of two (2) vessels in series [total of eight (8) vessels], and use of 14-foot diameter vessels arranged as three (3) sets of two (2) vessels in series [total of six (6) vessels]. Both options have similar capital costs and require nearly the same footprint. The 12-foot diameter vessels are a more standard option, while the 14-foot vessels are a custom design.

Each configuration can treat total flow up to 4,000 GPM (5.76 MGD), sufficient to handle maximum day flows with or without Madeira. At this flow, the GAC contactors operate at a surface loading rate of 8.8 GPM/SF, which is suitable for a foreseeable future until additional capacity is required. Should higher capacity be required to match the overall existing plant's treatment capacity of 6.0 MGD, the GAC contactor's surface loading rate would increase to 9.2 GPM/SF, which remains with the recommended range of 2 of 10 GPM/SF as specified by the ten states standards.

To simplify design, construction, and future maintenance, the 12-foot diameter vessel option was selected. The proposed 12-ft diameter PFAS treatment vessel system will consist of four (4) treatment trains, each train with two (2) vessels in series, for a total of eight (8) vessels. The proposed GAC contactor vessels would be 12-feet diameter and approximately 25 feet in height. Within the new building, an electrical room is proposed, which will house the necessary electrical equipment to operate the PFAS treatment system and booster pumps.

The backwashing process for the GAC media is designed to maintain performance and media longevity by gradually increasing and then decreasing the backwash flow through the vessels to thoroughly agitate and clean the media. This process ensures effective removal of accumulated contaminants and solids. Backwash waste generated during this cleaning process is calculated to be approximately 38,200 gallons and will be collected and stored in two (2) 21,000-gallon Baker trucks provided onsite, sized appropriately to handle the volume of waste produced. Backwash waste from the vessels inside the building will be collected and transferred via hose connections to the Baker trucks onsite for offsite disposal.

Site civil improvements include paving and grading around the new building, new parking spaces are planned next to the treatment building to accommodate staff and visitors. Additionally, space will be provided for the two (2) proposed 21,000-gallon Baker trucks, on the site to collect backwash waste generated from the treatment vessels.

The new treatment plant components will be sized to handle a maximum day flow (MDF) of approximately 4,000 GPM, or 5.76 million gallons per day (MGD) to meet the projected 2045 MDD (5.59 MGD). Should a higher capacity be required to match the overall existing softening capacity (6.0 MGD or 4,164 GPM), the GAC contactor's surface loading rate could be increased to increase to 9.2 GPM/SF, which is less than the maximum Ten State Standards recommended loading rate of 10 GPM/SF.

A rapid small-scale column test (RSSCT) of GAC media was performed. The results indicate that (1) the GAC media will achieve the required treatment for PFAS compounds and (2) in a lead-lag configuration, the lead vessel will require a media changeout approximately every 30 months. See Appendix D for details and the RRSCT setup and results.

2.1.2 Water Supply Wells

As outlined in Section 1.6.1, the existing water supply system cannot meet demands during drought conditions. If the Village is to maintain a 6.0 MGD treatment system, the available water supply must meet or exceed the project demands. The proposed improvements include three (3) additional raw water supply wells (1.1 MGD each) and 7,000 LF of raw water mains to provide the additional water supply capacity. This includes drilling and equipping new wells, installation of raw water piping and fittings from the wells to the plant, well access platforms, pumps, and associated site improvements such as sediment control and electrical instrumentation to support increased well production.

2.1.3 Water Tower

Consistent with the Village's 2025 Master Plan Report (Section 1.7.1), this alternative includes a new 1.0 MG water tower. The Village received an opinion of probable construction cost of approximately $7.0M for the new elevated tower.

2.1.4 Water Main Improvements

Water main improvements are also part of this alternative and include approximately 800 linear feet of new 8-inch water main from the south end of Calderwood Lane to the west end of Manor Hill Lane. Existing water mains along Shawnee Run Road (between Miami Road and Drake Road) and Drake Road (from Shawnee Run Road to Loveland Madeira Road) replaced as a new 16-inch main. These upgrades are presented in Figure 2-1.

In terms of resiliency, the Village maintains a backup water supply connection with GCWW to ensure continued service during emergencies or for maintenance.

2.1.5 O&M

Operation and Maintenance under Alternative 1 Includes energy consumption for operating the new PFAS treatment facility, including booster pumps, pressure carbon contactors, and energy use for the treatment building (such as lighting, ventilation and temperature control). It also includes maintenance material costs for carbon contactors, general supplies, pumps, instrumentation repair, valve replacement or repair, sampling, and other miscellaneous work items. This item also includes carbon media replacement every 30 months based on recommendations from the RSSCT testing results (Appendix D). Annual O&M costs for the existing water treatment plant (WTP) and distribution system were obtained from the Townhall Presentation based on the IHWW 2024 Budget ($1.3M and $1.9M, respectively) and escalated to 2025 using a 3% O&M escalation rate. The WTP O&M cost was reduced by approximately $70,000 to reflect the reduced O&M costs following Madeira's departure from the IHWW water supply. This reduction was determined using a breakdown of IHWW O&M budget costs. Thus, the resulting annual average O&M costs for the WTP and distribution system are $1.27M (2025 dollars), and $1.96M (2025 dollars), respectively.

O&M costs for Alternative 1 were split into fixed and variable costs. The variable, flow-dependent portion includes energy costs for the new booster pumps, carbon contactors, and carbon media replacement, as these costs rise with increased water production. All other O&M expenses, excluding these variable costs, were treated as fixed annual costs. The fixed components operation remained constant every year through the 20-year period whereas the variable components were increased to match the flow demand increase annually. The sum of fixed and variable costs was calculated for each year as annual O&M costs, they were also escalated (using an O&M escalation rate of 3%) to account for inflation for each year.

The Village retains control over water rates, levels of service, water quality, and infrastructure projects under this alternative. Operating costs and infrastructure improvements are supported by local user fees, maintaining local control and funding for the water system.

2.2 ALTERNATIVE 2 – WHOLESALE CUSTOMER TO GCWW & MAINTAINS IHWW DISTRIBUTION SYSTEM OPERATIONS

2.2.1 GCWW Supply Interconnection

Under Alternative 2, the Village would transition from operating its own water treatment facilities to purchasing treated surface water directly from GCWW as a wholesale customer. As a result, the Village's existing water treatment infrastructure, including wells and treatment plant, would no longer be necessary and abandoned. This alternative includes demolition of all current treatment facilities like the clearwells, high service pump building, Plant No. 1 and Plant No. 2 buildings, ion exchange vessels, chemical feed building and systems, process piping and valves, pavements, fencing and gates, electrical systems, as well as the grouting and capping of wells.

To integrate the GCWW supply with the Village's existing distribution system, three (3) metered interconnections are anticipated. These interconnections will allow treated water to flow from the GCWW distribution network into the Indian Hill Water Works distribution system. The preliminary locations for these connection points are near the western boundary of the existing network, as shown in the Figure 2-1.

2.2.2 Water Tower

Consistent with the Village's 2025 Master Plan Report (Section 1.7.1), this alternative includes a new 1.0 MG water tower. The Village received an opinion of probable construction cost of approximately $7.0M for the new elevated tower.

2.2.3 Water Main Improvements

Additionally, water main improvements outlined in Alternative 1 are included in this alternative. Beyond these, Alternative 2 also requires upgrading roughly 5,800 linear feet of existing water main along Spooky Hollow Drive to a 12-inch diameter as shown in Figure 2-1. It is important to note that the distribution system was originally sized to deliver water produced on the east side of the Village. However, water will be delivered from the west side from GCWW interconnection, necessitating these improvements to ensure adequate transmission capacity.

2.2.4 O&M

The O&M costs for this alternative include the expenses related to operating and maintaining the existing water distribution system. GCWW would supply treated water to the IHWW distribution network, which would continue to be operated and maintained by IHWW. IHWW would continue to read meters, repair leaks and main breaks, and provide water line locating services. This O&M cost estimate is based on the IHWW 2024 Budget presented at the Townhall and escalated to 2025 using a 3% O&M escalation rate for future costs. An additional annual cost of $100,000 was included to account for one (1) operator transferring from the WTP to support distribution system operations as the position currently supports distribution O&M efforts. For Alternative 2, the presented O&M costs were treated as fixed costs. Variable annual costs were represented by GCWW supply and distribution rates (as explained in Section 2.2.5), which increase annually in proportion to flow demand. For Alternative 2, the GCWW base rates were escalated by 2% per year.

2.2.5 GCWW Water Rates

The May 2024 GCWW proposal to provide wholesale water to the Village included a wholesale customer water rate of $2.53 per hundred cubic feet (CCF) of water. The GCWW proposal also included a stipulation that indexed the rate to the Consumer Price Index (CPI). To determine the average CPI inflation rate, the annual percent change in the yearly CPI was calculated for each year, 2013 to 2025. The average of these annual percentage changes was then computed, excluding the unusually high increases observed in 2021 and 2022 (e.g. COVID-19 impacts). Based on this analysis, the historical annual average CPI inflation rate was 2.7%. For consistency in this analysis, items requiring cost inflation over time were adjusted using this average CPI inflation rate. This analysis is based on 2025 costs and therefore the initial proposed GCWW wholesale water rate of the 2024 cost $2.53/CCF was inflated by 2.7% for 2025, and for each year thereafter, the rate was increased by 2.7%. The resulting annual wholesale rate was then multiplied by the projected average annual water demand, which grows by 0.0321 MGD per year, as described in Section 1.5 to calculate the total yearly cost of supply.

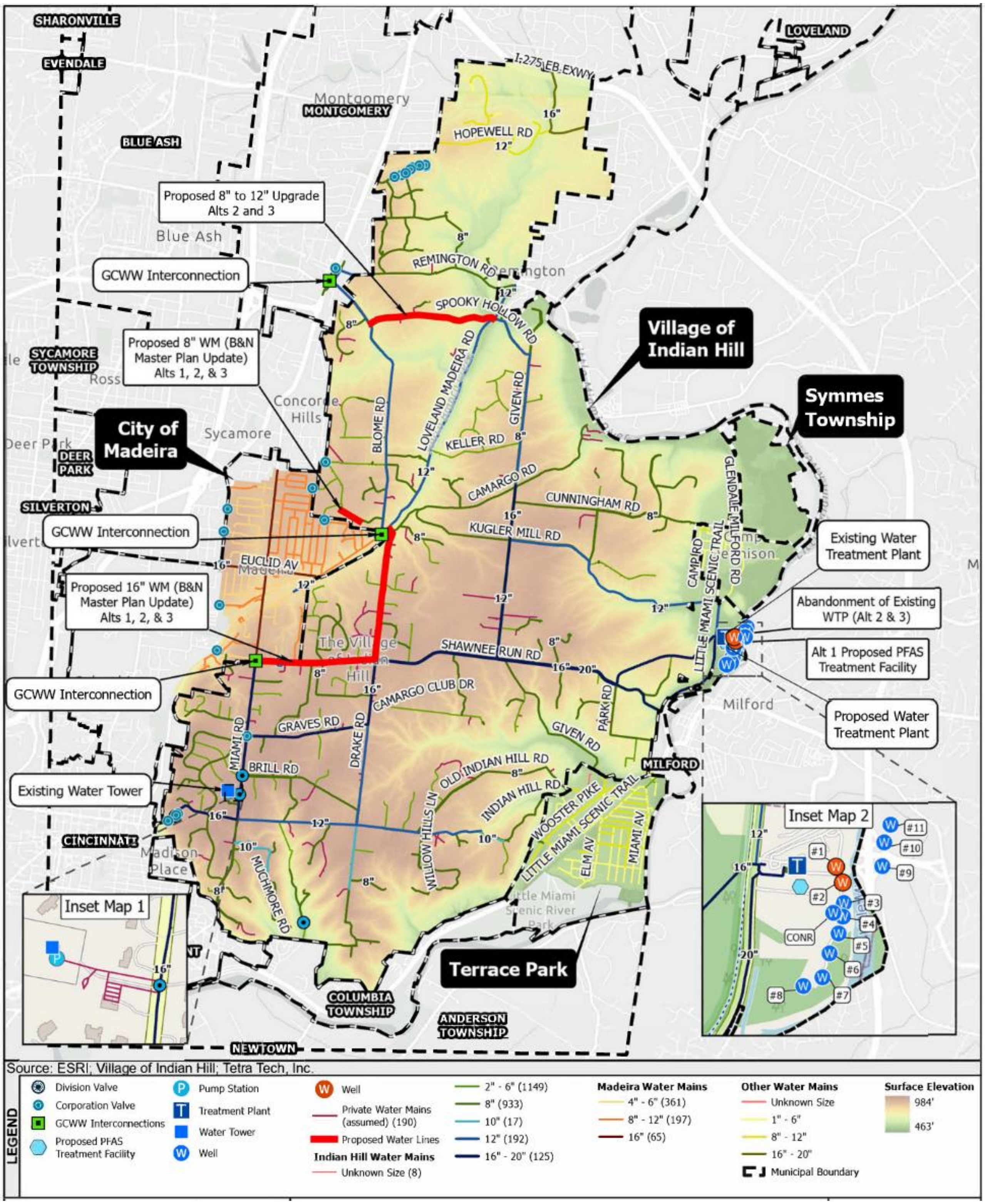

Figure 2-1: Village of Indian Hill Water Works Water Distribution Map (Existing and Proposed)

2.3 ALTERNATIVE 3 - GCWW SUPPLY & DISTRIBUTION

2.3.1 GCWW Supply Interconnection and Distribution

In this alternative, the Village would completely transfer ownership and operation of its water supply, treatment and distribution system, fully transitioning water service responsibilities to Greater Cincinnati Water Works (GCWW). As a result, all existing water treatment and supply infrastructure would be demolished, similar to the processes described in Alternative 2.

2.3.2 Water Tower

Consistent with the Village's 2025 Master Plan Report (Section 1.7.1), this alternative includes a new 1.0 MG water tower. The Village received an opinion of probable construction cost of approximately $7.0M for the new elevated tower.

2.3.3 Water Main Improvements

To support the transition of supply from GCWW, water main upgrades are required to ensure adequate capacity, pressure, and flow within the system. The required improvements are consistent with those identified in Alternative 2, ensuring the system can meet increased demand and integrate with GCWW's distribution network.

2.3.4 O&M

This alternative does not include any O&M responsibilities for IHWW, as GCWW staff will fully operate and maintain the entire water supply, treatment, and distribution system.

2.3.5 GCWW Water Rates

Alternative 3 includes turning over all water supply, treatment, and distribution services to GCWW. Water supply costs for Alternative 3 were based on the February 4, 2025 GCWW proposal to Maderia, which generally follows GCWW published rates under the category "Incorporated Hamilton and Clermont Counties". The draft 2025 GCWW proposal to Madeira includes: $4.58/CCF (2025 Dollars), a 13% "infrastructure surcharge" (approximately $0.60/CCF), a flat monthly meter fee (varies by meter size), and a flat monthly "infrastructure surcharge" meter fee ($1.28/meter). For this analysis, the water rate costs were limited to the base rate ($4.58/CCF) and the flat meter fee $9.98 per ⅝-inch meter connection per month (both in 2025 dollars). The current number of meters served is 5,600, of which 2,200 are located in Madeira (3,400 in the IHWW service area). It should be noted that the monthly meter fee varies depending on meter size; this analysis assumes a smaller meter (⅝-inch meter) and thus a lower, more conservative cost ($9.98 per connection per month). While likely to be required in any final contract with GCWW, the "infrastructure surcharge" costs were omitted from this analysis and is considered a conservative assumption favoring Alternative 3.

GCWW publishes water rates for providing services to the region. The Village would fall into the billing category of "Incorporated Hamilton and Clermont Counties". This data was compiled over the last 10 years, see Figure 2-2. Figure 2-2 shows the annual GCWW rate ($/CCF) with their corresponding year-over-year percentage increases from 2016 through 2025. Over this 10-year period, the rate has steadily increased from $3.11/CCF in 2016 to $4.58/CCF in 2025. The long-term annual average increase over this timeframe is 4.4%. The minimum year-over-year increase over that timeframe is 3.9%. These are significantly higher than the 2.7% average CPI inflation rate included with becoming a wholesale customer (Alternative 2). For Alternative 3, the GCWW "Incorporated Hamilton & Clermont Counties" water service rate was assumed to escalate at 4.4% per year. It should be noted that the Village received wholesale customer information from GCWW indicating the 2026 increase will be 5.55%. This analysis does not include this higher rate increase.

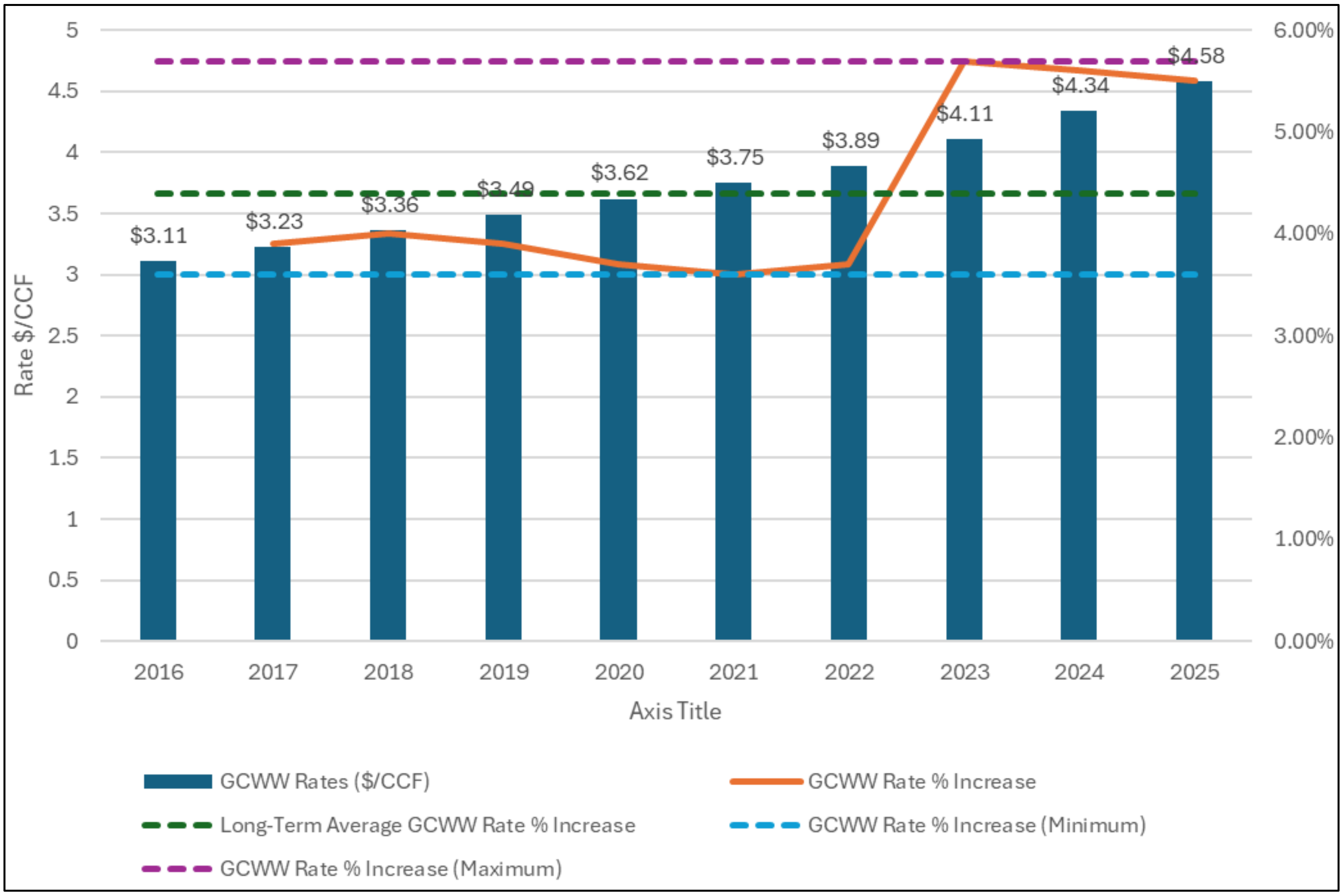

Figure 2-2: GCWW Historical Rates (2016-2025, Incorporated Hamilton & Clermont Counties)

2.4 ANNUAL CAPITAL IMPROVEMENTS

Annual capital improvements for each alternative were included to reflect the planned projects at the water treatment plant and water distribution system. The dollar amounts were derived from the CIP list provided by IHWW and used to estimate annual CIP costs through 2029. Beyond 2029, an annual capital cost of CIP projects of $1 million (in 2025 dollars) was allocated for repair and replacement of existing water mains every year. This $1 million was escalated each year after 2029 using a 2% Annual CIP Expense Escalation Rate for Alternatives 1 and 2. While the repair and replacement costs after 2029 theoretically apply to Alternative 3 as well, this cost was excluded for Alternative 3 as a conservative assumption.

The summary of annual CIP costs included in the analysis is presented in Table 2-1.

Table 2-1: Annual CIP Project Costs

Year	Alt 1 PFAS Treatment	Alt 2 GCWW Wholesale Customer	Alt 3 Transfer Assets to GCWW
2028	$2,763,000	$2,763,000	$2,763,000
2029	$3,230,000	$3,130,000	$3,130,000
Annually Starting in 2030	$1,000,000 (2025 Dollars) escalated at 2.7% per year		-

2.5 MONETARY EVALUATION

An evaluation was performed to compare the capital and long-term O&M costs for each alternative. Sections 2.1 through 2.3 provide details on capital and O&M costs, Section 2.2.5 and 2.3.5 summarizes water rates for applicable alternatives, and Section 2.5.4 summarizes the results of a Present Worth Analysis. Overall, the monetary evaluation includes the following components.

- Capital cost opinions were developed (AACE Level 5) including all associated work on the treatment plant site, the well field, and associated work within the water distribution system. Cost opinions include a 10% allowance for general conditions and a 25% contingency.
- The O&M costs were estimated for operations of existing and new WTP facilities and the distribution system. O&M costs for existing infrastructure were developed from recent IHWW O&M budgets. O&M for new infrastructure were developed to account for power needs, sampling requirements, building maintenance, media replacement, pump and other equipment repair. All future O&M costs were escalated. Flow-dependent O&M costs (e.g. power, chemicals) were also increased based on project demands.
- Two of the three (3) alternatives include regionalization options and include costs for long-term water usage at rates for alternate supply sources. The water rates were escalated at inflation rates specific to each alternative.

2.5.1 Potential Funding Impacts

The OEPA has programs to assist utilities implementing regionalization improvements and/or addressing emerging contaminants (e.g. PFAS) and small communities (service populations less than 10,000) implementing capital projects.

- **Emerging Contaminants:** OEPA can award up to $4 million in principal forgiveness funding and additional 0% interest loans for PFAS remediation projects. However, eligibility for this funding depends on whether the project qualifies and its position on the priority list.
- **Regionalization:** OEPA can award up to 50% of $4 million as principal forgiveness, contingent on project qualification.
- **Small Communities:** The Village anticipates borrowing through a 30-year loan term to finance PFAS removal and Water Tower capital expenses, and a 20-year term for other capital costs, should loans or bonds be pursued. OEPA offers small communities a Water Supply Revolving Loan Account (WSRLA) Small Systems Rate with an interest rate of 3.2%.

The capital-intensive alternatives (Alternative 1) could realize more financial benefits from OEPA funding as compared to lower-capital alternatives (Alternatives 2 and 3). To maintain a conservative approach, the monetary evaluation does not consider potential grants or 0% interest loans for proposed improvements.

2.5.2 Alternatives Capital Cost Summary

A summary of the costs associated capital expenses for each alternative described in Sections 2.1 through 2.3 are shown in the Table 2-2.

Table 2-2: Alternatives Capital Cost Summary

Description	Alternative 1	Alternative 2	Alternative 3
Treatment Equipment	$10,130,000	-	-
Booster Pump Station	$510,000		
Site Improvements	$320,000	-	-
Building	$2,520,000	-	-
GCWW Interconnections	-	$750,000	-
Water Main Installation	$9,400,000	$12,385,000	$12,385,000
Water Tower	$5,100,000	$5,100,000	$5,100,000
WTP Demolition	-	$1,850,000	$1,850,000
Additional Production Wells	$6,720,000	-	-
General Conditions (10%)	$3,470,000	$2,009,000	$1,934,000
Contingency (25%)	$8,675,000	$5,022,000	$4,834,000
Total (2025 Dollars)	**$46,850,000**	**$27,120,000**	**$26,110,000**
Total (2028 Dollars)	**$50,750,000**	**$29,380,000**	**$28,290,000**

2.5.3 Alternatives O&M Cost Summary

A summary of the O&M costs for each alternative described in the sections 2.1.5, 2.2.4 and 2.3.4 are shown in the table below.

Table 2-3: Alternatives O&M Cost Summary

Description	Alternative 1	Alternative 2	Alternative 3
Building Heating	$8,232	-	-
Building Electricity	$28,000	-	-
Treatment Process Electricity	$62,048	-	-
Pump Maintenance	$4,534	-	-
Instrumentation Maintenance	$54,314	-	-
Media Replacement	$136,960	-	-
Sampling	$53,295	-	-
Building Maintenance	$9,446	-	-
Water Treatment Plant O&M	$1,266,900	-	-
Water System O&M	$1,957,000	$2,060,000	-
Total (2025 Dollars)	**$3,581,000**	**$2,060,000**	**-**
Total (2028 Dollars)	**$3,880,000**	**$2,240,000**	**-**

2.5.4 Present Worth Analysis

A Present Worth Analysis was conducted to convert all future costs including capital investments and ongoing operations and maintenance expenses into their equivalent present-day costs. This method allows for a comparable assessment of each alternative's total cost over the planning period. The present worth of future costs was calculated using Equation 2.

Equation 2: Present Worth Calculation

$$\begin{aligned} &Total\ Present\ Worth \\ &\quad = Total\ Capital\ Cost + Present\ Worth\ of\ O\&M\ and\ Water\ Rates \\ &\quad + Present\ Worth\ of\ Salvage\ Value + Present\ Worth\ of\ Future\ Captial \\ &\quad + Present\ Worth\ of\ Salvage\ Value\ on\ Future\ Captial \end{aligned}$$

$$Present\ Worth\ of\ Future\ Cost = Future\ Cost * \frac{(1+i)^n - 1}{i * (1+i)^n}$$

where:

$\boldsymbol{Total\ Capital\ Cost} - the\ costs\ for\ design\ and\ construction\ of\ all\ project\ components.\ Captial\ costs\ do\ not\ include\ enginering,\ legal,\ administrative,\ or\ project\ contingency.$

$\boldsymbol{Annual\ O\&M}$ **and Water Rates** $- the\ annual\ average\ cost$ (1) $to\ provide\ power,\ chemicals,\ media,\ maintenance,\ and\ operations\ for\ the\ proposed\ improvements$ and/or (2) to provide water service from GCWW.

$\boldsymbol{i} - the\ real\ discount\ rate$ (%)

$\boldsymbol{n} - the\ planning\ period\ (years)$

The Present Worth Analysis included the following assumptions:

- **Planning Period.** The analysis was conducted over a 20-year planning period. This period was selected to balance long-term financial planning with reasonable forecasting accuracy.
- **Discount Rate.** The Present Worth Analysis used a real discount rate of 2.2%, as published by the U.S. Office of Management and Budget (OMB) in Circular No. A-94 (Appendix C).
- **Salvage Value.** The value of capital improvements was straight-line depreciated over the planning period to determine the salvage value.
  - Civil works, site improvements, piping, and structures are assumed to have a 50-year service life.
  - Mechanical, electrical, and other equipment are assumed to have a 20-year service life.
- **O&M Escalation Rate.** An O&M escalated rate of 3% was applied for the escalation of recurring annual O&M costs to reflect anticipated increases in labor, materials, and energy prices over time.

Table 2-4: Present Worth Analysis

Description	Alt 1 PFAS Treatment at WTP	Alt 2 GCWW Wholesale Customer	Alt 3 Transfer Assets to GCWW
Capital Cost	$50,750,000	$29,380,000	$28,290,000
Present Worth of Salvage Value	$(15,912,000)	$(11,024,000)	$(10,601,000)
Present Worth of Annual O&M	$83,053,000	$111,377,000	$152,011,000
Present Worth of Future Annual CIP	$25,884,000	$25,788,000	$5,700,000
Present Worth of Salvage Value for Future Annual CIP	$(15,530,000)	$(15,473,000)	$(3,420,000)
Total Net Present Worth	**$128,245,000**	**$140,048,000**	**$171,980,000**

3.0 SELECTED ALTERNATIVE

The Alternatives Evaluation concluded that continuing the current IHWW Supply & Distribution with the addition of PFAS treatment upgrades at the existing WTP site is (1) the most cost-effective alternative to meet the USEPA PFAS MCLs, and (2) is able to meet the USEPA compliance deadline of April 26, 2029. The following text presents a layout for the proposed alternative, including proposed capital improvements and intended operations.

3.1 SITE LAYOUT

The existing WTP site provides sufficient space immediately south of the current high-service pump station and clearwell to construct a new treatment building housing the PFAS GAC contactor vessels. The building footprint is approximately 130 feet by 60 feet. Inside, roughly two-thirds of the space will accommodate GAC contactor vessels. The remaining one-third of the building will house four (4) booster pumps and an electrical room for pump controls and power distribution.

A 40-foot-wide driveway will connect the existing WTP to the new treatment building, facilitating operational access. Adjacent to the building's west side, eight (8) parking spaces will be provided for staff and visitors. On the east side, two (2) designated spaces measuring 47 feet long by 8.5 feet wide each will be reserved for Baker trucks to store backwash waste generated from the GAC contactor vessels. These components are shown on a preliminary site plan in Figure 3-2.

3.1.1 Yard Piping

A new connection from the existing raw water pipeline system will be constructed to serve the proposed GAC treatment vessels. This includes two (2) new 16-inch raw waterlines: a connection to the raw water headers from Wells 3, 4, 5, 6, 7, and 8, and the other connecting the header from Wells 9, 10, and 11. These two (2) 16-inch lines will combine into a single 16-inch header that feeds the GAC contactor vessels.

Booster pumps will be installed on the diverted raw water flow from the wells, located upstream of the GAC filters. These pumps will maintain the required water pressure and flow through the treatment system, ensuring operational reliability, with a total pumping capacity of 4,000 GPM. The pressurized discharge from the booster pumps will flow through the GAC contactor vessels for treatment.

Treated water from the new PFAS treatment facility will be discharged through a 16-inch finished water line back to the well headers. This 16-inch header will split into two (2) 16-inch lines that reconnect to the two (2) well headers. An isolation valve will be installed on the well headers downstream of the PFAS treatment diversion and upstream of the finished water tee connection from the PFAS facility. This valve will normally remain closed during PFAS treatment operations to isolate the treatment system as needed.

3.1.2 Additional Well Pumping Capacity

The proposed improvements include three (3) new raw water supply wells (1.1 MGD capacity each) and about 7,000 LF of associated water mains connecting each well to a common header that feeds into the existing treatment facility to provide additional well production capacity. This work covers test well drilling, new well drilling with casing and screens, test pumping at rated flow, well inspection, installation of raw water piping and fittings from the wells to the plant, well access platforms, pumps, and associated site improvements such as sediment control and electrical instrumentation for the new wells.

3.1.3 Proposed PFAS Treatment System

Activated carbon adsorption is has been proven as a suitable processes or treatment technologies for removing PFAS from drinking water systems due to its high removal efficiency, ease of scaling up, and low maintenance requirements. The GAC treatment systems for facilities with capacities less than 10 MGD are typically provided in pressure vessels that are arranged in a lead-lag configuration. The vessels are operated in series until the lead vessel reaches a trigger value at which time the media is removed and replaced in the lead vessel and the lag vessel becomes the new lead vessel. GAC media requires the greatest bed depth of any of the adsorptive media commonly used for PFAS treatment. Therefore if required in the future, it is possible to replace the GAC with another type of media, such as IX resin which requires about one-third to one-fourth the bed depth. To do this conversion, the OEPA would need to permit the changes and the inlet distribution system would require modification.

The PFAS system designed to meet the capacity goals and finished water quality goals established in Chapter 2 of this report is proposed for PFAS treatment. Table 3-1 present design criteria for the proposed PFAS treatment facility. Figure *3*-1 provides a process flow diagram for the proposed improvements showing tie-ins with the existing plant and water mains.

The GAC treatment facility will consist of four (4) parallel systems of GAC contactor vessels, each containing two (2) 12-foot diameter by 25-foot tall vessels arranged in series (lead-lag configuration), totaling eight (8) vessels. Each train is capable of treating flow in a range that supports system flexibility for phased media replacement and optimized operation. The system is designed to handle a MDD of approximately 4,000 GPM (5.76 MGD), sufficient to handle maximum day flows with or without Madeira. At 4,000 GPM, the GAC contactors operate at a surface loading rate of 8.8 GPM/SF, which is appropriate until additional capacity is required. Should higher capacity be required to match the overall existing plant’s treatment capacity of 6.0 MGD (4,164 GPM), the GAC contactor’s surface loading rate would increase to 9.2 GPM/SF, which is still within the recommended loading range of 2.0 of 10 GPM/SF as specified by the Ten State Standards.

The feed to the new PFAS removal facility is raw water from the nine (9) ground water wells and also will be supplemented from the three (3) proposed raw water supply wells. Feed from the wells will first go through an inline booster pump station to increase the pressure needed through the GAC contactor vessels. The filtered effluent from the GAC system will be sent back to the well headers for further treatment at the existing WTP. The following table provides a summary of the recommended adsorption system.

Table 3-1: GAC Filter Design Criteria

Criteria	Value
Design Flow Rate, MGD	6.0
Design Flow Rate, GPM	4,167
Firm Capacity, GPM	4,167
Media:	GAC, Bituminous Coal, 0.55 to 0.75 mm
Min Superficial Flow, GPM/sf	2.0
Max Superficial Flow, GPM/sf	10.0
Design Minimum EBCT, min	9.5
Container Type	Pressure Vessel
Vessel Diameter, ft	12
GAC Maximum Depth, ft	11.82 (40,000 lbs of carbon)
GAC Volume per Vessel, cf	1,337
Configuration	Lead and Lag Vessel in Series
Number of Vessels per Train	2 (Lead and Lag Vessel)
Number of Trains	4
Total Number of Vessels	8
Flow per Train, GPM	1,042
Empty Bed Contact Time (EBCT) at Rated Flow, min	9.6
Superficial Velocity at Rated Flow, GPM/sf	9.2
Minimum Flow (all vessels online), MGD	1.3

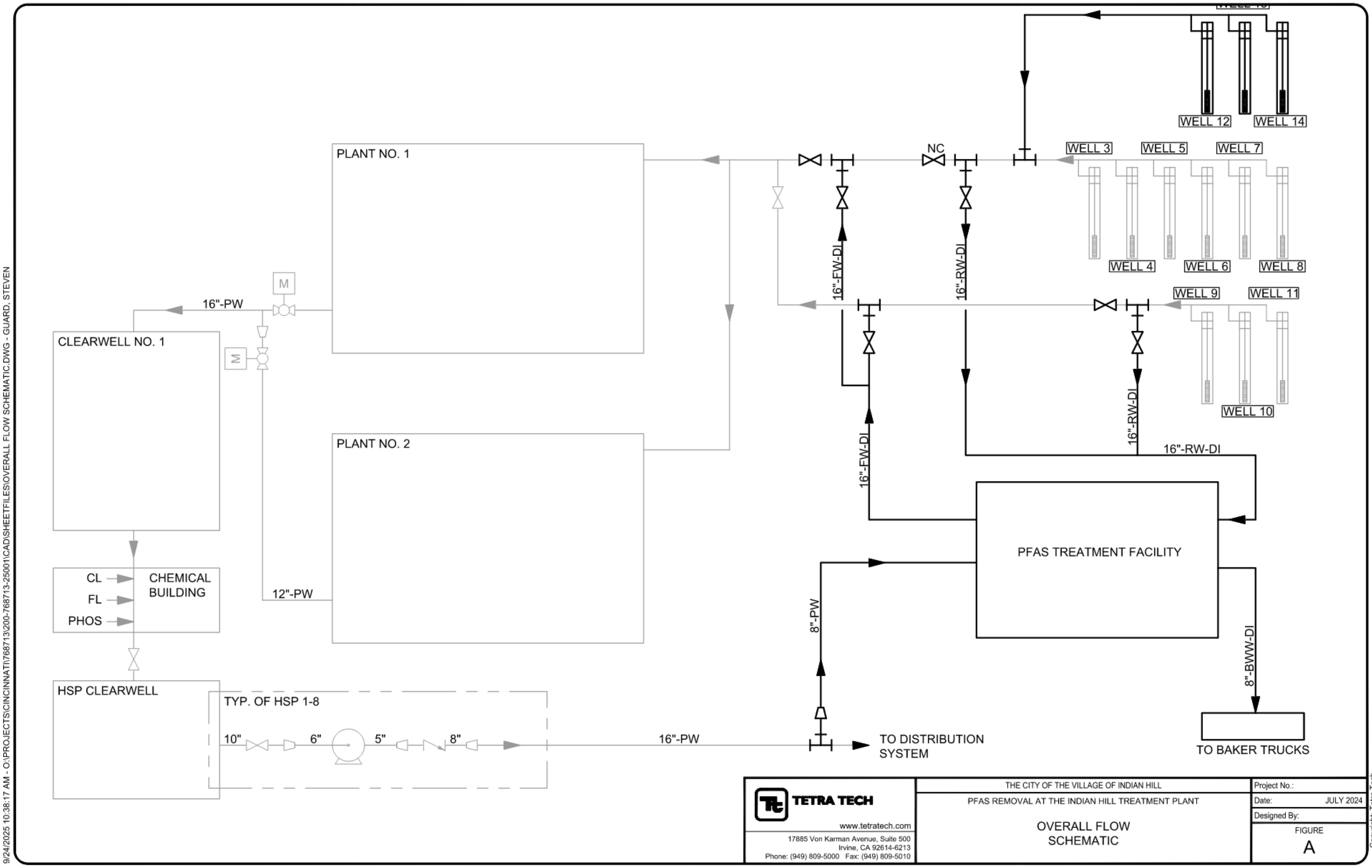

Figure 3-1: Proposed Process Flow Diagram

3.1.4 GAC Filter Backwash

GAC contactor vessels typically require minimal backwashing to avoid mixing exhausted media with media with available adsorption capacity, which can reduce bed life. In instances of high head loss, a gentle backwash flow may be applied to clean the media, resulting in a relatively small volume of backwash water.

The vessels do need to be backwashed during initial set-up, before placing the vessels in operation. The reasons for backwashing before placing fresh media online are to: (1) size segregate the media so subsequent backwashing will return the media to the same relative position in the bed, (2) remove any remaining air from the bed, and (3) remove media fines which can lead to excessive pressure drop and flow restriction. In addition, proper backwashing is a crucial step to collecting the most representative and meaningful post-start up data on compounds of interest, such as metals listed in the NSF/ANSI 61 standard.

The following information summarizes the recommended backwash volume for the GAC system during initial setup, based on a manufacturer's recommendations. Other manufacturers are likely to have similar flow rates and tank sizing, which will be taken into account during the final design. Below are the steps for proper conditioning and backwashing of GAC being backwashed at 55°F.

Fully submerge GAC bed in clean, contaminant free water for at least 16 hours (overnight). Once the soaking period is complete, conduct a start-up backwash (up-flow operation) per the steps outlined below:

1. Open backwash inlet and begin up-flow at 3 GPM/sf for 2 minutes
2. Increase flow to 5 GPM/sf and maintain for 2 minutes
3. Increase flow to 7 GPM/sf and maintain for 2 minutes
4. Increase flow to 8.5 GPM/sf and maintain for 30 minutes
5. Decrease flow to 7 GPM/sf and maintain for 2 minutes
6. Decrease flow to 5 GPM/sf and maintain for 2 minutes
7. Decrease flow to 3 GPM/sf and maintain for 2 minutes
8. Close backwash inlet and stop flow

Table 3-2: GAC System Backwash Design Criteria

Rate, GPM/sf	Rate, GPM	Duration, min	Volume per Vessel, gal
3	339	3	1,100
5	565	2	1,200
7	792	2	1,600
8.5	961	30	28,900
7	792	2	1,600
5	565	2	1,200
3	339	2	700
		Total Backwash Volume, GAC System, gal	36,300
		Safety Factor	5%
		Minimum Tank Size, gal	38,200

3.1.4.1 Filter Backwash Supply

Water required to backwash the GAC filters will be taken from the finished water transmission line after the existing high service pumps. This water should not contain any significant concentration of PFAS compounds and should be suitable for discharge to a receiving water body. The backwash water will be supplied from a branch off the high service pump discharge header. The branch line will be equipped with a hydraulically actuated backpressure sustaining valve to maintain pressure in the distribution system and reduce the pressure to the filters. A rate of flow controller or a meter and modulating control valve would be installed downstream to control the rate of backwash flow to the filters. The backwash line would be sized to supply flow to backwash a single GAC contactor at a time.

3.1.4.2 Spent Filter Backwash Handling

Spent filter backwash water from the GAC contactor vessels will be conveyed to onsite frac tank type of storage. The total backwash waste generated during this process is estimated at approximately 38,200 gallons as shows in Table 3-2. This waste will be collected and stored in two (2) onsite 21,000-gallon Baker trucks, which are sized to accommodate the volume produced. Backwash waste will be transferred from the vessels inside the building to the Baker trucks via hose connections for temporary onsite storage and subsequent offsite disposal.

3.1.5 PFAS Booster Pump Station

The existing wells currently pump to Plant No. 1 and Plant No. 2 at a raw water pressure of 20 psi. Head loss across the GAC treatment trains is expected to reach 15 psi. Therefore, additional pressure is required to boost pressure through the GAC contactor vessels back to the well headers which lead to Plant No. 1 and Plant No. 2.

A new inline booster pump station will be installed upstream of the proposed PFAS treatment process. The new pump station will be located in the proposed PFAS treatment building. The feed pump station building will include an electrical/control room. The booster pump station will be equipped with 4 horizontal split case pumps operating in parallel with a firm capacity of 6.0 MGD. The booster pumps will be equipped with variable frequency drives (VFDs) and will be designed to operate automatically with the well pumps.

The combined 16-inch header from the well header will enter the building below grade and will convert to above grade piping inside the building. Each pump suction piping will be equipped with isolation valves, and each pump discharge piping will be equipped with isolation valves and check valves. The combined 16-inch discharge header will be below grade within the building in a trench covered by fiberglass reinforced plastic (FRP) grating. The design criteria for booster pumps are given in Table 3-3.

Table 3-3: Booster Pumps – Design Basis

Criteria	Value
PFAS Max Feed Flow, MGD	6.0
Number of Duty Pumps	3
Number of Standby Pumps	1
Firm Capacity, MGD	6.0
Flow per pump, MGD	2.0
Flow per pump, GPM	1,400
Head, ft	50
Type	Horizontal, single-stage, split-case pump
Drive Type	Variable Frequency Drive
Motor Power, hp	25

A preliminary site layout of the proposed PFAS facility with the treatment vessels and booster pumps is presented in Figure 3-2.

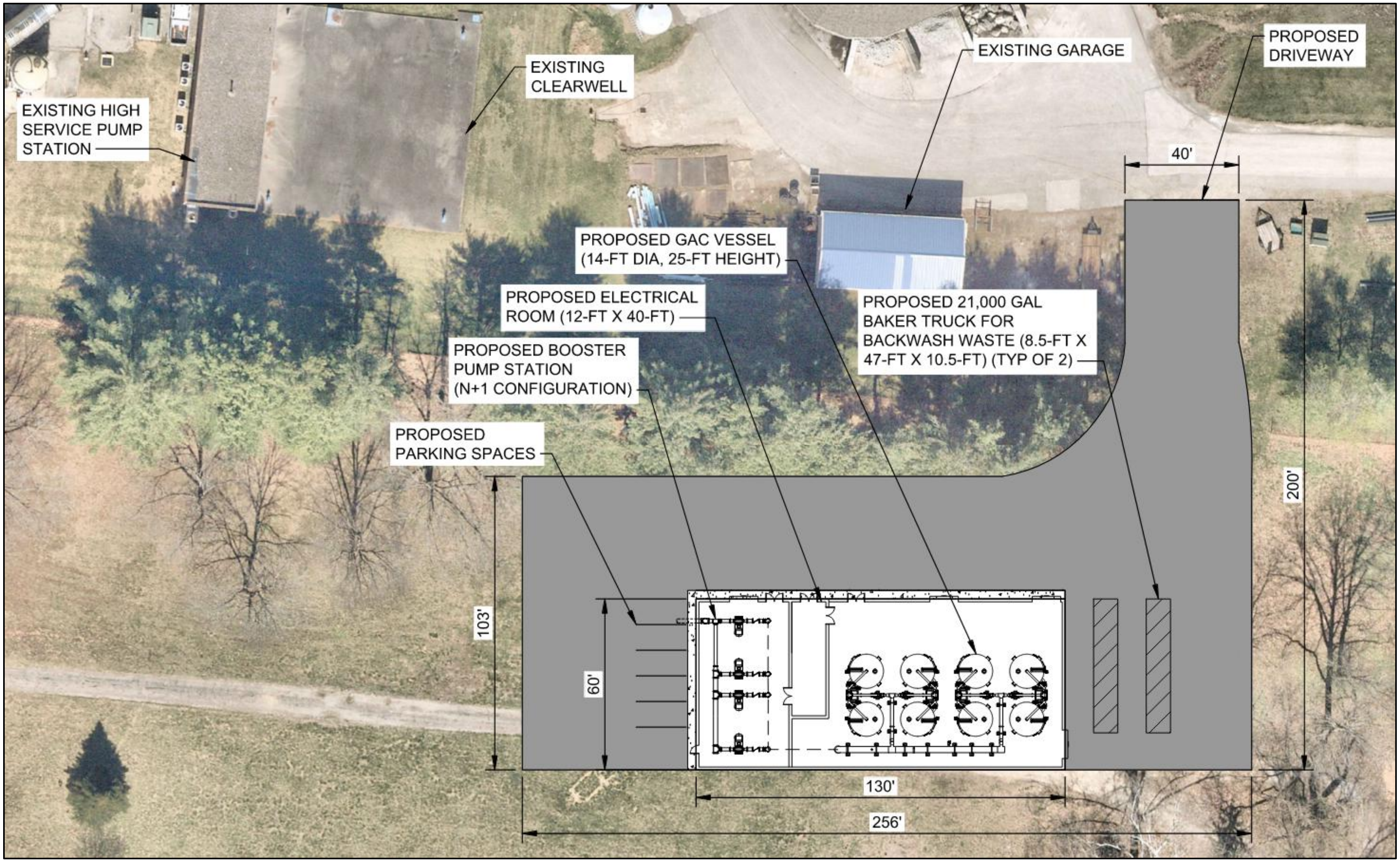

Figure 3-2: Proposed Site Plan

3.2 PRELIMINARY ESTIMATE

An opinion of probable construction cost (OPCC) was developed for the selected alternative. The OPCC was developed to an AACE Class 5 level of detail. Table 3-4 presents the OPCC and total present worth of the proposed improvements.

Table 3-4: Selected Alternative - OPCC and Present Worth

Description	Capital Cost
Treatment Equipment	$10,130,000
Booster Pump Station	$501,000
Site Improvements	$320,000
Building	$2,520,000
GCWW Interconnections	-
Water Main Installation	$9,400,000
1.0 MG Water Tower	$5,100,000
Additional Raw Water Supply	$6,720,000
Construction Sub-Total	**$34,700,000**
General Conditions (10%)	$3,470,000
Contingency (25%)	$8,675,000
Grand Total Capital Cost (2025 Dollars)	**$46,900,000**
Grand Total Capital Cost (2028 Dollars)	**$50,750,000**
AACE Class 5 Estimate High Level (+100%) (2028 Dollars)	$101,500,000
"AACE Class 5 Estimate Low Level (-50%)(2028 Dollars)	$25,375,000
Description	Total Project Cost
Capital Cost (2028 Dollars)	$50,750,000
Annual O&M (2028 Dollars)	$3,880,000
Present Worth of Annual O&M	$83,053,000
Present Worth of Salvage Value (Capital Investments)	$(15,586,000)
Present Worth of Future Annual CIP	$25,884,000
Present Worth of Salvage Value for Future Annual CIP	$(15,530,000)
Total Present Worth (Planning Period - 20 years)	**$128,245,000**

4.0 PUBLIC PARTICIPATION

The Village actively engages its residents through public meetings held by Village Council and various committees, most of which convene monthly. All meetings are publicly advertised and posted on the Village's website (https://indianhill.gov/), providing residents with the opportunity to attend and comment. Typically, at least one (1) Village staff member and one (1) Council Member attend each committee meeting, often with several of each present.

The Water Works Committee discussed the Village's plans and progress on meeting PFAS MCL compliance at each of the following meetings. Refer to Water Works Committee packets from each of the meetings in Appendix E.

- April 9, 2024
- May 14, 2024
- June 11, 2024
- August 13, 2024
- September 4, 2024
- October 15, 2024
- November 12, 2024
- December 10, 2024
- January 14, 2025
- February 11, 2025
- March 11, 2025
- April 15, 2025
- May 13, 2025
- June 10, 2025
- August 12, 2025
- September 9, 2025

At Council meetings, Council members serving as committee representatives share highlights from the committee meetings held earlier in the month. PFAS MCL compliance updates were presented as part of all the following Council meetings. Council agenda packets and minutes are viewable online at: https://indianhill.gov/council-meetings/ and at https://indianhill.gov/council-meeting-archive

- February 20, 2024
- March 18, 2024
- April 15, 2024
- May 20, 2024, including a special PFAS Work Session
- June 17, 2024, including a special PFAS Work Session
- August 19, 2024
- September 16, 2024
- October 21, 2024
- November 18, 2024
- December 16, 2024
- January 21, 2025
- February 18, 2025
- March 17, 2025
- April 21, 2025
- May 19, 2025
- June 16, 2025
- August 18, 2025
- September 15, 2025

In January 2025, the Village contracted with Hometown Strategies, a community engagement consultant, to help inform and involve the public about the history of IHWW, current issues IHWW faces, and future sustainability of IHWW. The messaging included background and statistics about IHWW's system, expected customer base changes, methods of addressing PFAS regulation compliance, financial impacts, and other topics.

Three Town Hall Meetings were organized by Hometown Strategies and the Village. Invitations were mailed by letter to property owners near potential water tower sites. All residents who provided their email addresses for Village communications were also emailed an invitation. The "Indian Hill Bulletin," the official newspaper of the Village, is printed and mailed to all property owners within the Village as well as posted on the Village's website. The Indian Hill Bulletin was also utilized to advertise the community engagement process. Articles were published on the front pages of the February 26, March 26, and April 30, 2025 editions about the community engagement process and to advertise the Town Hall meetings. The May 28, 2025 edition included an article to thank residents for their participation and to encourage additional feedback to continue to be submitted to the Village. Copies of the Indian Hill Bulletin are viewable on-line at: https://indianhill.gov/bulletin-archive.

A link to information and other items related to the community engagement process were also linked on the home page of the Village's website for several months in 2025. Town Hall Meetings were held on March 13, April 15, and May 14 of 2025. Two (2) separate venues (Livingston Lodge and Indian Hill High School's auditorium) within the Village were used to hold the anticipated crowds, which exceeded capacity of the Village's Council Chambers. As the meetings were well attended, many questions & comments were received from the public after the conclusion of the presentation by staff. An exit survey was also available (in hard copy format, as well as on-line) to attendees. Both the exit survey and a general input/inquiry Google form were linked on the Village's website, and also linked from a feature on the home page to https://indianhill.gov/town-hall-meetings. All public comments were compiled and summarized in a report by Hometown Strategies (Appendix E).

The Village also assembled a group of resident volunteers to serve on a "Village Advisory Committee" (VAC). The VAC held four (4) meetings during the community engagement process to disseminate supplied information about IHWW, provide guidance on the presentation content and layout at the Town Hall presentations, and collect and summarize resident feedback from either attending or reading summaries of the three (3) Town Hall meetings, as well as reading surveys, emails, letters, and other methods of feedback provided by residents. The VAC meetings were held on the following dates: March 5, March 25, April 28, and May 29, 2025. Hometown Strategies wrote a summary of each of the first three (3) VAC meetings. The VAC wrote a summary report (dated June 10, 2025) of their findings and recommendations after the 4th VAC meeting and presented it to Village Council at the June 16, 2025 Council meeting. The VAC meeting agenda and packets are available online at: https://indianhill.gov/town-hall-meetings. Appendix E includes recap summaries for the first three (3) VAC meetings, and the June 10, 2025 summary report written by the VAC. Another VAC meeting and summary report is anticipated to occur in the Fall of 2025.

4.1 INFORMATIONAL WEBPAGE

IHWW also developed the following webpage providing information and data to inform and educate the public on PFAS: https://indianhill.gov/community-engagement.

5.0 ENVIRONMENTAL ISSUES

No environmental issues have been observed near the area of proposed improvements. The property has been owned by the Village since June 30, 2022 and is adjacent to the Village well field and WTP. This area has not been utilized for any operations/activities since Village ownership.

6.0 FUNDING

The Village has a multi-facetted approach to funding proposed improvements included in this General Plan. Table 6-1 summarizes the Village funding strategy for the design and construction of proposed improvements.

- **Water Supply Revolving Loan Account (WSRLA) Loans.** The Village has been in regular communication with the Department of Environmental Financial Assistance (DEFA) at OEPA on funding all aspects of its efforts to address PFAS in the water supply. A key component of the funding strategy is the use of Emerging Contaminant (EC, principal forgiveness) loans from DEFA. The amount of EC monies available will not be sufficient to cover the expected costs of the General Plan. The Village intends to maximize the use of zero-interest loans to pay for design services and construction activities. If required, the Village will pursue low-interest loans to fund portions of the work.
- **Grants.** The Village is active in pursuing all available grants to help offset the approach identified below. As grant opportunities become available, the Village will also apply for additional funding to minimize impacts to rate payers.
- **PFAS Litigation Settlements.** The Village is participating in class-action lawsuits against PFAS manufacturers. Monies from any settlement will be applied to paying for any improvements to address PFAS contamination.
- **Water Rate/Local Funds.** The Village collects revenue through water rates. The revenues will be used to directly fund activities and/or pay debt-service from loans/bonds.
- **Bonds.** Bonds will be pursued if loans and/or grants are insufficient to provide full funding for the proposed improvements.

Table 6-1: General Plan – Funding Strategy

Phase	Approach
Design Phase Services (30% through 100%)	Apply for WSRLA loan (principal forgiveness or zero-interest). Use PFAS settlement monies to paydown or payoff loan amount.
Construction Phase Engineering and Construction Inspection	Apply for WSRLA loan (principal forgiveness, zero-interest, and/or low-interest). Use PFAS settlement monies to paydown or payoff loan amount.
Construction Activities	Apply for WSRLA loan (principal forgiveness, zero-interest, and/or low-interest). Use PFAS settlement monies to paydown or payoff loan amount.

7.0 COMPLIANCE SCHEDULE

The Village currently complies with all relevant federal and state regulations. The improvements associated with the selected alternative will allow the Village to meet the USEPA PFAS MCL compliance deadline of April 26, 2029. The initial draft of the General Plan is scheduled for submission to OEPA in October 2025, followed by OEPA review. Approval of the General Plan and the commencement of the design phase are expected by February 2026. Completion of the design and OEPA review/approval is anticipated by December 2026. The public advertisement, bidding, and award process is expected to be completed within two (2) months, by February 2027. The new facility should be commissioned and operational by February 2029. Allowing for a 24-month construction period, the project timeline ensures that the EPA's PFAS treatment compliance deadline in April 2029 will be achieved. This timeline provides adequate time to complete design, bidding , construction, and commissioning of the treatment facilities to ensure full compliance with EPA mandates by the required date.

APPENDIX A: 2024 PFAS REMOVAL EVALUATION REPORT

APPENDIX B: ZONING MAP

APPENDIX C: LIST OF CAPITAL IMPROVEMENT PROJECTS

APPENDIX D: RSSCT TESTING RESULTS

APPENDIX E: PUBLIC PARTICIPATION ATTACHMENTS

APPENDIX F: CITY OF MADIERA ORDINANACE NO. 25-02 UPDATES